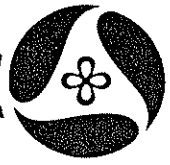
Determination of Asphalt Content and Characteristics of Bituminous Paving Mixtures

Final Report for MLR-88-11

September 1988

Highway Division



Iowa Department of Transportation

Determination of Asphalt Content and Characteristics of Bituminous Paving Mixtures

Final Report for
Project MLR-88-11

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ABSTRACT

Due to the hazardous nature of chemical asphalt extraction agents, nuclear gauges have become an increasingly popular method of determining the asphalt content of a bituminous mix.

This report details the results of comparisons made between intended, tank stick, extracted, and nuclear asphalt content determinations. A total of 315 sets of comparisons were made on samples that represented 110 individual mix designs and 99 paving projects. All samples were taken from 1987 construction projects.

In addition to the comparisons made, seventeen asphalt cement samples were recovered for determination of penetration and viscosity. Results were compared to similar tests performed on the asphalt assurance samples in an attempt to determine the amount of asphalt hardening that can be expected due to the hot mix process.

Conclusions of the report are:

1. Compared to the reflux extraction procedure, nuclear asphalt content gauges determine asphalt content of bituminous mixes with much greater accuracy and comparable precision.

2. As a means for determining asphalt content, the nuclear procedure should be used as an alternate to chemical extractions whenever possible.

3. Based on penetration and viscosity results, softer grade asphalts undergo a greater degree of hardening due to hot mix processing than do harder grades, and asphalt viscosity changes caused by the mixing process are subject to much more variability than are changes in penetration.

4. Based on changes in penetration and viscosity, the Thin Film Oven Test provides a reasonable means of estimating how much asphalt hardening can be anticipated due to exposure to the hot mix processing environment.

INTRODUCTION

In 1985, personnel from the Iowa Department of Transportation Central Materials Laboratory investigated the effectiveness of a Troxler 3241-B nuclear asphalt content gauge for determining asphalt cement content of bituminous mixes. The objective was to find a safe and effective alternate to methylene chloride vacuum extractions for asphalt content determination of a bituminous mix sample. Results of the investigation confirmed that the Troxler 3241-B asphalt content gauge can safely and rapidly determine asphalt content within limits specified in ASTM D2172-81 "Quantitative Extraction of Bitumen From Bituminous Paving Mixtures" (1).

Six additional gauges were purchased in 1986 for use in the District Materials Laboratories. Calibration procedures were developed and reported in MLR-87-2, and operational procedures were specified in Office of Materials Instructional Memorandum 355 (3). The nuclear asphalt determination method has been used by the District Laboratories for project monitoring purposes since the beginning of the 1987 construction season.

Use of methylene chloride vacuum extractions was eliminated after 1987, and District Laboratories became equipped to perform reflux extractions using 1-1-1 trichloroethane for the 1987 construction season. Although not as toxic as methylene chloride and not identified as a carcinogen, 1-1-1 trichloroethane is considered hazardous and its use requires special handling and disposal procedures. Efforts are being made to develop specifications and procedures

that will reduce, if not eliminate, the necessity for even this type of extraction.

Asphalt content determinations are needed so a monetary value of a quantity of milled asphalt mix or recycled asphalt product (RAP) can be estimated based on the amount of asphalt cement it contains. Asphalt content and aggregate gradation information is also necessary for proper design of asphalt mixes utilizing RAP as one of the components. Payment for asphalt added to a mix on a paving project is based not on extractions, but on tank stick measurements, where the bulk amount of asphalt added to the mix is physically measured and determined on a daily basis.

Due to the elimination of methylene chloride vacuum extractions and the reduction of 1-1-1 trichloroethane reflux extractions, future emphasis will be focused on nuclear asphalt content determination results for asphalt content monitoring purposes.

As emphasis on asphalt content determinations shifts from extraction to nuclear methods, it becomes increasingly important that the nuclear procedure is performed properly, and that valid nuclear mix calibrations are being used at all times. Experience gained through utilization of asphalt content gauges for two construction seasons has shown that steps can be taken that will improve precision of the nuclear method. District personnel should develop three-point calibrations (0.995 minimum correlation factor) for every mix used in their District regardless of whether the mix was

designed in their lab or in the Central lab. Use of actual cold feed production samples and project asphalt will yield the most accurate calibration possible and eliminate error caused by gradation differences between mix design aggregate and the actual final hot mix product. Development of mix nuclear calibrations in District labs will also eliminate the degree of error introduced by transferring a calibration from the Central lab gauge to a District gauge. If all calibrations are not performed in the District labs, then, at a minimum, validity of the calibration transferred to the District should be verified by adding a known asphalt amount to a cold feed sample and then measuring asphalt content with the gauge. If the reading is off by 15% or more, the calibration should be considered invalid, and a new three point calibration should be prepared using cold feed samples.

Nuclear test results that appear later in this report were obtained without the benefit of some of the precision enhancing activities described in the previous paragraph. Future implementation of these measures may be considered at a later date.

PROBLEM STATEMENT

With the emphasis of asphalt content determination shifting from extraction to nuclear methods, it would be beneficial to evaluate the performance and effectiveness of the nuclear asphalt content gauges operating in the District Laboratories over an entire construction season.

The primary objective of this study was to evaluate nuclear asphalt content gauge determination results by examining comparisons made between Central Lab and District nuclear determinations, reflux extraction determinations, tank stick measurements, and the intended asphalt contents for a large number and variety of mix samples.

Of secondary interest in this study is a cursory investigation of the amount of hardening undergone by the asphalt cement due to oxidation from exposure to high temperatures in the asphalt plant. Information of this type from actual projects will be of value when selecting asphalt grades for particular applications and field conditions.

PROCEDURE & SCOPE

This study was performed in conjunction with MLR-88-2, "Gradation Analysis of Cold Feed and Extracted Bituminous Mix Samples", in which a series of extracted gradations were compared with cold feed gradations to determine the magnitude of any changes that occur from drying, mixing, and laydown (2). The asphalt content data from those extractions formed the basis for this report.

Hot mix box samples for this study were collected by District personnel from 1987 bituminous paving projects and delivered to the Central Materials Laboratory.

Information provided with each sample, pertinent to this study, included:

Material Description
Project No.
County
Contractor
Mix Design No.
Date Sampled
Percent Asphalt Intended
Percent Asphalt (Tank Stick)
Percent Asphalt (District nuclear determination)

Sampling was to be distributed over the project length as evenly as possible. For project mix quantities greater than 10,000 tons, five samples were submitted, and three samples were submitted for project mix quantities under 10,000 tons. For the cold feed gradation study, 396 samples representing 110 mix designs and 99 projects were received and processed by the Central Materials Bituminous Section. The processing involved a 1-1-1 trichloroethane reflux extraction for gradation and asphalt content determination, a nuclear asphalt determination on those samples for which a nuclear calibration was available, and asphalt recovery by the Abson Method for which penetration and viscosity of the residue was determined. Recoveries were performed on seventeen of the 396 samples.

In order that mathematical data developed from the study is meaningful, only complete data sets, those that include intended asphalt content, tank stick, extracted asphalt content, and District and Central Laboratory nuclear asphalt determinations, have been

considered for this study. Of the 396 samples processed under MLR-88-2, 315 samples representing 95 mix designs had complete asphalt content data sets and were included for this study.

The mix information, along with all test results, was entered into a Lotus 1-2-3 Version I data base. In this format, as shown in Appendix A, the data for each complete sample set is displayed and calculations are performed. Differences between each of the four asphalt determinations and the intended asphalt content are calculated for each sample. Comparisons are made based on averages, standard deviations and standard errors of the differences.

The nuclear and extraction results are also compared to tank stick measurements in the same fashion. Since tank stick measurements yield the actual average daily asphalt added to the mix, these comparisons are more meaningful than when simply comparing determined asphalt percentages to the intended content.

The second part of this study investigates the relationship between asphalt penetration and viscosity data determined both before and after mixing. To accomplish this, asphalt recoveries were performed on seventeen hot mix box samples using the Abson recovery method (AASHTO T-170-84). On the recovered asphalt, penetration (100 grams for 5 seconds at 77°F) and absolute viscosity (140°F and 300 MMHg) are determined and compared to the same information on the assurance test report for the original asphalt and the Thin Film Oven Test (TFOT) residue. Percent changes in penetration and

viscosity are determined and categorized according to asphalt viscosity grade. The ratios should indicate the amount of hardening caused by processing through the hot mix plant. The TFOT was developed to imitate the effects of heat and oxidation on the asphalt caused by asphalt plant mixing processed, and is used to predict whether a particular asphalt will react satisfactorily. The comparisons made in this study will provide an indication of the effectiveness of this test in performing its intended function.

Penetration and viscosity data was obtained on seventeen mixes from seven different asphalt sources. The seventeen asphalts consisted of six AC-5's, eight AC-10's, and three AC-20's.

RESULTS: ASPHALT CONTENT

A summary of the results of the asphalt contents, as compared to the intended contents, is shown in Table I. The complete table of individual sample results and comparisons can be found in Appendix A.

All results in Table I are based on comparisons with the intended asphalt content for the date the box sample was taken. Table II summarizes result of comparisons made to tank stick determinations using the same set of samples. The complete results for these comparisons are found in Appendix B.

From Table I, it can be seen that the average intended asphalt content for all 315 mix samples in this study is 5.70%. Average tank

TABLE I:

ASPHALT CONTENT DETERMINATION METHOD:
COMPARISON TO INTENDED ASPHALT CONTENT

Analysis Category	Asphalt Content Determination Method				
	Intended	Extracted	Tank Stick	District Nuc. Gauge	Central Lab Nuc. Gauge
Average Asphalt Content	5.70	5.55	5.73	5.68	5.63
Average Diff. From Intended		-0.15	0.03	-0.02	-0.07
Std. Deviation of Differences		0.25	0.13	0.27	0.24
Standard Error		0.014	0.007	0.015	0.014

TABLE II:

ASPHALT CONTENT DETERMINATION METHOD:
COMPARISON TO TANK STICK ASPHALT CONTENT

Analysis Category	Asphalt Content Determination Method			
	Tank Stick	Extracted	District Nuc. Gauge	Central Lab Nuc. Gauge
Average Asphalt Content	5.73	5.55	5.68	5.63
Avg. Diff. From Tank Stick		-0.18	-0.05	-0.10
Std. Deviation of Differences		0.25	0.27	0.24
Standard Error		0.014	0.015	0.014

stick asphalt content is 5.73%, average extraction content is 5.55%, average District nuclear content is 5.68%, and average Central Lab nuclear content is 5.63%.

The proximity of the tank stick average to the intended average is not unexpected since this measurement is physically made, and represents an overall average content for asphalt metered into the mix for a days production. As such, tank stick determinations are not subject to the asphalt content variability which occurs from batch to batch or truckload to truckload during the normal course of a day's mix production. The standard deviation of the difference between tank stick and intended asphalt content of 0.13 indicates overall reasonably good control by contractors of adding asphalt to the mix.

Due to the reduction of chlorinated solvent extractions and increased reliance on nuclear gauges, a close examination of the performance of these two procedures is warranted. The average extracted asphalt content of 5.55% is 0.15% less than the intended average. It is not unusual for an extracted asphalt content to be several tenths of a percent lower than the actual asphalt content of the sample due to the difficulty of removing 100% of the absorbed asphalt. Action of the chemical solvent and agitation of the sample during refluxing is normally insufficient to remove all the asphalt from absorptive aggregate. The result of -0.15% for this study should be considered reasonable for the reflux extraction procedure.

Although reflux results in the study are considered reasonable and acceptable, nuclear gauge results were even better. Compared to the average intended asphalt content, the District Nuclear average of 5.68% is excellent, and for all practical purposes, the average difference of -0.02% is insignificant. The Central Lab nuclear average of 5.63% and -0.07% resulting average difference was also superior to the extraction results. Standard deviation of the differences of 0.25, 0.27, and 0.24 for extraction, District nuclear, and Central lab nuclear results respectively, are essentially the same, indicating that approximately the same amount of variability can be expected with each of the three methods. It should be pointed out that the variability represented by the standard deviations is not strictly a function of the test method, but is a combination of material and testing variability. If asphalt content variability of the samples were somehow eliminated, the anticipated standard deviations would be even smaller, resulting in greater testing precision than indicated from the above data.

Standard error, which is calculated by dividing the standard deviation by the number of items being considered, is another indicator of the precision of the method. The smaller the standard error, the greater is the precision of the procedure. A review of the standard error of the three methods indicates no significant differences in precision.

In summarizing Table I results, accuracy of the methods, as compared to the intended asphalt content, is greatest using the District nuclear gauges (5.68% ac). Tank stick determination is next at 5.73%, followed by the Central Lab nuclear gauge (5.63%), and finally the reflux extraction method at 5.55% average asphalt content. Precision of extraction and nuclear methods is the same. Precision of the tank stick method is much greater since it is not subject to variability induced by mix production and material sampling and handling.

Table II was developed based on the concept of the tank stick asphalt content, as opposed to intended content, being the actual asphalt content of the mix.

When compared to the tank stick average of 5.73%, the extracted asphalt content average of 5.55% is .18% less. The District nuclear content was again most accurate at 5.68% and the Central Lab nuclear average was next at 5.63%. Standard deviation and standard error are the same as in Table I.

RESULTS: ASPHALT CHARACTERISTICS

Results of asphalt penetration and viscosity tests, as categorized and averaged by asphalt viscosity grade, are reported in Table III.

Penetration and viscosity for the six AC-5 asphalt assurance samples averaged 175 (.1mm) and 510 poises respectively, while the penetration and viscosity for the recovered asphalt averaged 87 and

TABLE III

COMPARISON OF ASPHALT PROPERTIES:
ASSURANCE SAMPLE, TFOT RESIDUE, AND RECOVERED ASPHALT SAMPLES

Project No.	Mix Description	Plant Type	Asphalt Source	Asphalt Grade	Assurance Pen.	Assurance Visc.	Recovery Pen.	Recovery Visc.	Recov vs Assur. % P	Recov vs Assur. % V	Thin Film Oven Test Pen	Thin Film Oven Test Visc.	TFOT vs Recov. % P	TFOT vs Recov. % V
SN-4906(4)	1/2" B Cl I	Drum	Amoco/Linwood	AC-5	160	485	68	1397	42.5	288.1	82	1250	120.6	89.5
FM-46(8)	3/4" B Cl I	Drum	Koch/Dubuque	AC-5	200	520	97	1507	48.5	289.8	98	1460	101.0	96.9
FM-11(10)	3/4" B Cl II	Drum	Jebro/Sioux City	AC-5	176	536	74	2276	42.0	424.6	80	1690	108.1	74.3
SN-217(8)	3/4" B Cl II	Drum	Jebro/Sioux City	AC-5	169	486	87	1608	51.5	330.9	74	1480	85.1	92.0
SN-4689(9)	3/4" B Cl II	Drum	Amoco/Linwood	AC-5	160	496	76	1449	47.5	292.1	--	1240	--	85.6
SN-3362(2)	3/4" B Cl I	Contin.	B.M.S./Algona	AC-5	184	539	120	1066	65.2	197.8	95	1350	79.2	126.6
				AC-5 Avg.	175	510	87	1551	49.7	304.1	86	1412	96.4	91.0
FM-07(10)55	1/2" A	Batch	Koch/Dubque	AC-10	117	1010	60	3457	51.3	342.3	65	2600	108.3	75.2
SN-1684(1)	3/4" B Cl I	Drum	B.M.S./Algona	AC-10	128	933	70	2481	54.7	265.9	69	2440	98.6	98.3
SN-8036(6)	3/4" B Cl I	Batch	Amoco/Davenport	AC-10	122	998	73	2420	59.8	242.5	67	2470	91.8	102.1
FN-3-2(21)	3/4" B Cl I	Drum	B.M.S./Algona	AC-10	126	927	74	2276	58.7	245.5	69	2290	93.2	100.6
SP-607-0(3)	3/4" B Cl I	Contin.	Koch/Omaha	AC-10	110	1100	66	2606	60.0	236.9	64	2600	97.0	99.8
FR-63-8(13)	3/4" B Cl I	Drum	Koch/Dubuque	AC-10	129	920	58	3909	45.0	424.9	73	2200	125.9	56.3
SP-685-0(1)	3/4" B Cl I	Contin.	B.M.S./Algona	AC-10	137	903	88	1814	64.2	200.9	72	2380	81.8	131.2
FM-23(6)	3/4" B Cl I	Drum	Amoco/Linwood	AC-10	134	974	88	1811	65.7	185.9	71	2540	80.7	140.3
				AC-10 Avg.	125	971	72	2597	57.5	267.5	69	2440	95.8	94.0
IR-35-3(47)87	1/2" A	Drum	B.M.S./Tama	AC-20	69	2160	50	5155	72.5	238.7	42	5630	84.0	109.2
IR-80-3(52)99	3/4" A	Batch	Koch/Omaha	AC-20	77	2150	56	3940	72.7	183.3	46	5020	82.1	127.4
F-20-9(65)	1/2" A	Contin.	Koch/Dubuque	AC-20	78	2110	72	2761	92.3	130.9	64	5230	88.9	189.4
				AC-20 Avg.	75	2140	59	3952	79.4	184.7	51	5293	86.4	133.9

1551 poises. This equated to nearly a 50% decrease in asphalt penetration and more than a 300% viscosity increase due to processing through the asphalt plant. A look at individual penetration numbers reveals a reasonably close grouping around the 50% level, with an exception being the AC-5 from the Bituminous Materials Supply (B.M.S.) terminal at Tama, Iowa, which retained 65% of its original penetration. Of the individual viscosity results, four were close to the 300% increase level, a Jebro/Sioux City sample showed an increase of nearly 425%, and the B.M.S./Tama viscosity increase was only 198%. Results on Thin Film Oven Test (TFOT) residue showed an average penetration (based on five samples) of 86 and average viscosity of 1412 poises. Compared to results of tests performed on recovered asphalt, TFOT penetration and viscosity averages of 96.4% and 91.0% respectively, indicate that for AC-5's, a reasonable estimate of asphalt hardening due to the hot mix operation can be made based on TFOT results.

Penetration and viscosity averages for eight AC-10 assurance samples were 125 and 971 poises respectively. Penetrations which ranged from 110 to 137, and viscosities ranging from 903 to 1100 poises demonstrate reasonable consistency in the initial properties of the samples. Recovery penetrations averaged 72 with a range of 30, representing 57.5% of the assurance penetration. Recovery viscosities averaged 2597 poises, representing a 267% average increase from the assurance sample results. The viscosities ranged from 1811 to 3090, a difference of 2098 poises, and increases ranged from 185.9% to 424.5%. TFOT penetration and viscosity re-

sults averaged 69 and 2440 with ranges of 9 and 400 poises respectively. TFOT results, as a percentage of recovery results, were 95.8 for penetration and 94.0 for viscosity. With the exception of Koch/Dubuque FR-63-8(13) sample, the individual percent penetrations were reasonably consistent, however for viscosity, the percentages ranged from 75.2 to 140.3.

The third group of asphalts consists of three AC-20's from three different sources. Assurance penetration and viscosity averaged 75 and 2140 poises, while recovery penetration and viscosity averaged 59 and 3952 respectively. Recovery viscosity results demonstrated little consistency compared to assurance samples, as shown by percentages ranging from 130.9 to 238.7. TFOT results averaged 51 for penetration and 5293 poises for viscosity, representing 86.4 and 133.9 percent of recovery results.

CONCLUSIONS: ASPHALT CONTENT

Referring to results summarized in Tables I & II, tank stick measurements still appear to be an excellent means of closely controlling and monitoring the asphalt content of mixes. When compared to average intended asphalt content, the average difference of +0.03% and difference standard deviation of 0.13% indicate the asphalt pavers perform well at hitting the daily asphalt content target on a regular basis.

Regardless of whether being compared to intended asphalt content or tank stick measurements, District nuclear gauge readings were most

accurate, followed by Central Lab nuclear gauge readings, and finally, reflux extraction results. The standard deviations for nuclear and extraction methods were all around the 0.25 level, indicating no significant difference in precision of the methods. However, since 1987 was the first year nuclear gauges were widely used in the materials labs, and results are extremely dependent on proper sample preparation and operating procedure, it is reasonable to expect that method precision will continue to improve as operators become more proficient and knowledgeable regarding nuclear gauge use.

The District nuclear gauge average asphalt content of 5.68% is only 0.02% less than intended and 0.05% less than the tank stick average. These are excellent results which cannot expect to be equalled by currently used extraction methods under even the most ideal conditions. Since nuclear asphalt content gauges provide results of equal precision but much greater accuracy than extraction methods, and since it is desirable to reduce employee exposure to hazardous chemical solvents, nuclear asphalt content gauges should be used as an alternate to chemical extractions whenever possible.

CONCLUSIONS: ASPHALT PROPERTIES

From a review of the results reported on the Comparison of Asphalt Properties found in Table III, the following general statements can be concluded:

1. Recovery penetration, as a percentage of assurance sample penetration, increases as the asphalt viscosity grade increases. Conversely, recovery viscosity, as a percentage of assurance sample viscosity, decreases as asphalt viscosity grade increases.

2. Recovery penetration, as a percentage of assurance sample penetration, was approximately 50% for AC-5, 60% for AC-10, and 80% for AC-20. Recovery viscosity, as a percentage of assurance sample viscosity, averaged approximately 300% for AC-5, 270% for AC-10, and 185% for AC-20. In summary, softer asphalts undergo a greater degree of hardening from the hot mix process than do the harder grade asphalts.

3. From examining individual recovery penetration and viscosity results, it appears that hot mix processing conditions affect viscosity with much greater variability than penetration for all three grades of asphalt tested.

4. Based on changes in penetration and viscosity, the Thin Film Oven Test provides a reasonable estimate of how much asphalt hardening can be anticipated due to exposure to the hot mix processing environment. On average, TFOT residue penetration and viscosity will be lower than for recovery samples. The only exception observed was the AC-20 viscosities, of which all were greater than 100%.

REFERENCES

1. "An Evaluation of the Troxler 3241-B Nuclear Asphalt Content Gauge", MLR-85-11, K. Jones, 1986, Iowa Department of Transportation

2. "Gradation Analysis of Cold Feed and Extracted Bituminous Mix Samples", MLR-88-2, J. F. Adam, 1988, Iowa Department of Transportation

3. "Calibration and Reliability of the Nuclear Asphalt Content Gauge", MLR-87-2, J. F. Adam, 1987, Iowa Department of Transportation.

Appendix A
Comparisons to Intended Asphalt Content

ASPHALT CONTENT ANALYSIS:
INTENDED VS. EXTRACTED, TANK STICK, DISTRICT NUCLEAR, & CENTRAL LAB NUCLEAR DETERMINATIONS

MIX DESIGN NO.	PROJECT-NUMBER	MATERIAL TYPE SIZE	TYPE	CL	R	ASPHALT CEMENT CONTENT DETERMINATIONS INT.	EXT.	DIFF.	T.S.	DIFF.	DNG.	DIFF.	CNG.	DIFF.
ABD7-137	IR-35-3(47)	1/2	A			6.20	5.93	-0.27	6.14	-0.06	5.89	-0.31	5.65	-0.55
ABD7-137	IR-35-3(47)	1/2	A			6.00	5.91	-0.09	5.95	-0.05	6.06	0.06	5.82	-0.18
ABD7-137	IR-35-3(47)	1/2	A			5.80	6.19	0.39	6.04	0.24	6.16	0.36	6.10	0.30
ABD7-137	IR-35-3(47)	1/2	A			5.80	5.95	0.15	6.04	0.24	6.16	0.36	6.08	0.28
ABD7-137	IR-35-3(47)	1/2	A			5.80	5.67	-0.13	5.69	-0.11	5.85	0.05	5.94	0.14
6ABD7-3	FM-28(7) & (9)	1/2	B	I		6.75	6.41	-0.34	6.76	0.01	6.56	-0.19	6.45	-0.30
6ABD7-3	FM-28(7) & (9)	1/2	B	I		6.75	6.66	-0.09	6.85	0.10	6.71	-0.04	6.75	0.00
6ABD7-3	FM-28(7) & (9)	1/2	B	I		6.75	6.51	-0.24	6.67	-0.08	6.58	-0.17	6.55	-0.20
6ABD7-3	FM-28(7) & (9)	1/2	B	I		6.75	6.34	-0.41	6.69	-0.06	6.60	-0.15	6.42	-0.33
6ABD7-3	FM-28(7) & (9)	1/2	B	I		6.75	6.50	-0.25	6.71	-0.04	6.73	-0.02	6.42	-0.33
3BD7-10	L-RES-3-73-60	1/2	B	II		6.20	6.10	-0.10	6.33	0.13	6.00	-0.20	6.50	0.30
3BD7-10	L-RES-3-73-60	1/2	B	II		6.20	6.13	-0.07	6.39	0.19	6.07	-0.13	6.58	0.38
3BD7-10	L-RES-3-73-60	1/2	B	II		6.20	6.10	-0.10	6.33	0.13	6.34	0.14	6.29	0.09
3BD7-6	SR-42(1)	3/4	B	II		5.90	5.74	-0.16	6.00	0.10	6.04	0.14	6.06	0.16
3BD7-6	SR-70(1)	3/4	B	II		5.70	5.35	-0.35	5.72	0.02	5.85	0.15	5.79	0.09
3BD7-6	SR-62(4)	3/4	B	II		5.70	5.52	-0.18	5.80	0.10	5.85	0.15	5.76	0.06
3BD7-6	SN-133(14)	3/4	B	II		5.70	5.25	-0.45	5.88	0.18	5.91	0.21	5.72	0.02
3BD7-6	SR-74(1)	3/4	B	II		5.70	5.38	-0.32	5.64	-0.06	5.69	-0.01	5.52	-0.18
3BD7-6	L-9-88-73-84	3/4	B	II		5.25	5.18	-0.07	5.00	-0.25	5.53	0.28	5.45	0.20
ABD7-194	IR-35-4(55)	3/4	A			4.60	4.27	-0.33	4.56	-0.04	5.00	0.40	4.66	0.06
ABD7-194	IR-35-4(55)	3/4	A			4.60	4.64	0.04	4.58	-0.02	4.78	0.18	4.73	0.13
ABD7-194	IR-35-4(55)	3/4	A			4.60	4.43	-0.17	4.52	-0.08	4.76	0.16	4.90	0.30
1ABD7-1	SN-4689(9)	3/4	B	I		6.00	5.58	-0.42	5.96	-0.04	6.11	0.11	5.80	-0.20
1ABD7-1	SN-4689(9)	3/4	B	I		6.00	5.40	-0.60	5.86	-0.14	5.13	-0.87	5.65	-0.35
1ABD7-1	SN-4689(9)	3/4	B	I		6.00	5.66	-0.34	5.59	-0.41	5.90	-0.10	6.15	0.15
1ABD7-1	SN-4689(9)	3/4	B	I		6.00	5.88	-0.12	6.06	0.06	6.35	0.35	5.79	-0.21
1ABD7-1	SN-4689(9)	3/4	B	I		6.00	6.07	0.07	6.30	0.30	6.36	0.36	6.24	0.24
ABD7-182	FN-18-6(23)	1/2	B	I	R	5.70	6.51	0.81	5.70	0.00	5.42	-0.28	5.68	-0.02
ABD7-182	FN-18-6(23)	1/2	B	I	R	5.70	5.37	-0.33	5.65	-0.05	5.34	-0.36	5.45	-0.25
ABD7-182	FN-18-6(23)	1/2	B	I	R	5.70	5.34	-0.36	5.60	-0.10	5.40	-0.30	5.22	-0.48

MIX DESIGN NO.	PROJECT-NUMBER	MATERIAL TYPE SIZE	TYPE	CL	R	ASPHALT CEMENT CONTENT DETERMINATIONS INT.	EXT.	DIFF.	T.S.	DIFF.	ONG.	DIFF.	CNG.	DIFF.
ABD7-146	FN-30-9(44)	3/4	B	I	R	6.20	5.82	-0.38	6.10	-0.10	6.08	-0.12	5.96	-0.24
ABD7-146	FN-30-9(44)	3/4	B	I	R	6.20	6.18	-0.02	6.21	0.01	6.37	0.17	6.18	-0.02
ABD7-146	FN-30-9(44)	3/4	B	I	R	6.20	5.92	-0.28	6.21	0.01	6.12	-0.08	6.13	-0.07
ABD7-146	FN-30-9(44)	3/4	B	I	R	6.20	5.98	-0.22	6.26	0.06	6.13	-0.07	5.96	-0.24
ABD7-146	FN-30-9(44)	3/4	B	I	R	6.20	6.10	-0.10	6.10	-0.10	6.08	-0.12	6.02	-0.18
ABD7-129	IR-29-4(33)72-12-43	3/4	A			5.00	5.18	0.18	4.99	-0.01	5.11	0.11	4.62	-0.38
ABD7-129	IR-29-4(33)72-12-43	3/4	A			5.00	4.88	-0.12	4.98	-0.02	5.13	0.13	4.33	-0.67
ABD7-129	IR-29-4(33)72-12-43	3/4	A			5.00	5.08	0.08	4.85	-0.15	5.14	0.14	4.76	-0.24
ABD7-133	IR-35-3(47) & 4(55)	3/4	B	I		5.50	5.16	-0.34	5.52	0.02	5.47	-0.03	5.51	0.01
ABD7-133	IR-35-3(47) & 4(55)	3/4	B	I		5.50	5.23	-0.27	5.52	0.02	5.47	-0.03	5.49	-0.01
ABD7-133	IR-35-3(47) & 4(55)	3/4	B	I		5.50	5.22	-0.28	5.50	0.00	5.49	-0.01	5.46	-0.04
ABD7-133	IR-35-3(47) & 4(55)	3/4	B	I		5.50	4.97	-0.53	5.56	0.06	5.42	-0.08	5.46	-0.04
ABD7-133	IR-35-3(47) & 4(55)	3/4	B	I		5.50	5.21	-0.29	5.56	0.06	5.42	-0.08	5.52	0.02
3BD7-3	SN-3238(5)	3/4	B	II		6.10	5.85	-0.25	5.91	-0.19	5.91	-0.19	5.89	-0.21
3BD7-3	SN-3238(5)	3/4	B	II		6.10	5.63	-0.47	6.32	0.22	6.16	0.06	6.06	-0.04
3BD7-3	SN-3238(5)	3/4	B	II		6.10	6.00	-0.10	6.33	0.23	6.29	0.19	6.26	0.16
3BD7-3	SN-3238(5)	3/4	B	II		6.10	5.83	-0.27	6.02	-0.08	6.22	0.12	5.88	-0.22
3BD7-3	SN-3238(5)	3/4	B	II		6.10	5.93	-0.17	6.17	0.07	5.94	-0.16	5.95	-0.15
6BD7-6	FN-22-3(31)	1/2	A			5.10	5.60	0.50	5.19	0.09	4.86	-0.24	5.10	0.00
6BD7-6	FN-22-3(31)	1/2	A			5.10	5.20	0.10	5.10	0.00	5.00	-0.10	5.13	0.03
6BD7-6	FN-22-3(31)	1/2	A			5.10	5.33	0.23	5.21	0.11	4.99	-0.11	5.04	-0.06
ABD7-66	FN-6-7(31)	1/2	A		R	5.10	5.03	-0.07	5.28	0.18	5.23	0.13	5.08	-0.02
ABD7-66	FN-6-7(31)	1/2	A		R	5.10	5.09	-0.01	5.24	0.14	5.04	-0.06	5.09	-0.01
ABD7-66	FN-6-7(31)	1/2	A		R	5.10	5.06	-0.04	5.16	0.06	5.00	-0.10	5.08	-0.02
ABD7-137	IR-35-4(55)	1/2	A			6.00	5.98	-0.02	5.94	-0.06	6.20	0.20	6.12	0.12
ABD7-137	IR-35-4(55)	1/2	A			5.80	5.64	-0.16	5.83	0.03	6.12	0.32	5.64	-0.16
ABD7-137	IR-35-4(55)	1/2	A			5.80	5.76	-0.04	5.86	0.06	6.37	0.57	6.08	0.28
ABD7-63	F-20-9(65)	1/2	A			5.80	5.68	-0.12	5.80	0.00	5.86	0.06	5.81	0.01
ABD7-162	SP-631-0(4)	1/2	B	I		5.90	5.90	0.00	5.95	0.05	6.18	0.28	6.14	0.24
ABD7-162	SP-631-0(4)	1/2	B	I		5.90	5.85	-0.05	5.90	0.00	6.38	0.48	5.96	0.06
ABD7-162	SP-631-0(4)	1/2	B	I		5.90	5.99	0.09	5.97	0.07	6.40	0.50	6.34	0.44
4MD7-1	SR-6302(4)	1/2	B	I		6.25	6.06	-0.19	6.45	0.20	6.01	-0.24	6.08	-0.17
4MD7-1	SR-6302(4)	1/2	B	I		6.25	6.32	0.07	6.29	0.04	6.41	0.16	5.95	-0.30
4MD7-1	SR-6302(4)	1/2	B	I		6.25	6.47	0.22	6.36	0.11	6.47	0.22	6.35	0.10

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ABD7-198	IR-35-2(199)	3/4	A			4.50	4.71	0.21	4.51	0.01	4.62	0.12	4.42	-0.08
3BD7-9(10)	SR-134(1)	3/4	B	II		6.25	5.46	-0.79	6.12	-0.13	6.37	0.12	6.01	-0.24
3BD7-9(10)	SR-134(1)	3/4	B	II		6.25	5.75	-0.50	6.51	0.26	6.13	-0.12	6.10	-0.15
3BD7-9(10)	SR-134(1)	3/4	B	II		6.25	5.75	-0.50	6.21	-0.04	6.41	0.16	6.47	0.22
3BD7-9(10)	SR-134(1)	3/4	B	II		6.25	5.26	-0.99	5.69	-0.56	6.27	0.02	5.87	-0.38
3BD7-9(10)	SR-134(1)	3/4	B	II		6.25	5.56	-0.69	6.26	0.01	6.34	0.09	6.11	-0.14
2BD7-6	SR-141(1)	3/4	B	I		5.80	5.12	-0.68	5.89	0.09	5.63	-0.17	5.40	-0.40
2BD7-6	SR-141(1)	3/4	B	I		5.80	5.29	-0.51	5.80	0.00	5.69	-0.11	5.67	-0.13
2BD7-6	SR-141(1)	3/4	B	I		5.80	5.09	-0.71	5.82	0.02	5.40	-0.40	5.36	-0.44
ABD7-143	SN-8036(6)	3/4	B	I		6.00	5.93	-0.07	5.97	-0.03	5.72	-0.28	5.55	-0.45
ABD7-143	SN-8036(6)	3/4	B	I		5.75	5.65	-0.10	5.78	0.03	5.33	-0.42	5.53	-0.22
ABD7-143	SN-8036(6)	3/4	B	I		5.40	5.27	-0.13	5.33	-0.07	5.04	-0.36	5.11	-0.29
ABD7-143	SN-8036(6)	3/4	B	I		5.40	5.25	-0.15	5.32	-0.08	5.26	-0.14	5.25	-0.15
ABD7-143	SN-8036(6)	3/4	B	I		5.40	5.30	-0.10	5.40	0.00	5.43	0.03	5.43	0.03
1BD7-8	SR-3448(4)	1/2	B	I		6.30	5.83	-0.47	6.46	0.16	5.74	-0.56	5.93	-0.37
1BD7-8	SR-3448(4)	1/2	B	I		6.30	6.15	-0.15	6.31	0.01	6.04	-0.26	6.07	-0.23
1BD7-8	SR-3448(4)	1/2	B	I		6.10	6.10	0.00	6.15	0.05	5.73	-0.37	6.07	-0.03
1BD7-8	SR-3448(4)	1/2	B	I		6.20	6.16	-0.04	6.25	0.05	5.79	-0.41	6.16	-0.04
1BD7-8	SR-3448(4)	1/2	B	I		6.20	5.91	-0.29	6.23	0.03	5.90	-0.30	5.90	-0.30
4BD7-4	SN-3192(11)	1/2	B	I		6.20	6.41	0.21	6.27	0.07	6.20	0.00	6.18	-0.02
4BD7-4	SN-3192(11)	1/2	B	I		6.20	6.13	-0.07	6.20	0.00	6.12	-0.08	6.00	-0.20
4BD7-4	SN-3192(11)	1/2	B	I		6.00	5.98	-0.02	5.82	-0.18	5.81	-0.19	5.77	-0.23
4BD7-4	SN-3192(11)	1/2	B	I		6.00	5.96	-0.04	6.02	0.02	5.68	-0.32	5.81	-0.19
1BD7-7	SN-46(11)	3/4	B	I		5.50	5.68	0.18	5.53	0.03	5.13	-0.37	5.52	0.02
1BD7-7	SN-46(11)	3/4	B	I		5.50	5.59	0.09	5.52	0.02	5.36	-0.14	5.48	-0.02
1BD7-7	SN-46(11)	3/4	B	I		5.50	5.70	0.20	5.44	-0.06	5.53	0.03	5.50	0.00
6BD7-9	SN-4906(4)	1/2	B	I		6.20	5.91	-0.29	6.21	0.01	6.11	-0.09	6.01	-0.19
6BD7-9	SN-4906(4)	1/2	B	I		6.20	5.97	-0.23	6.34	0.14	6.03	-0.17	6.20	0.00
6BD7-9	SN-4906(4)	1/2	B	I		6.20	5.91	-0.29	6.39	0.19	5.94	-0.26	5.71	-0.49
ABD7-32	FN-31-1(13)	3/4	A			5.35	5.58	0.23	5.49	0.14	5.20	-0.15	5.53	0.18
ABD7-32	FN-31-1(13)	3/4	A			5.35	5.21	-0.14	5.49	0.14	5.20	-0.15	5.90	0.55
2BD7-11	FM-46(8)	3/4	B	I		5.80	6.07	0.27	5.97	0.17	6.13	0.33	5.92	0.12
2BD7-11	FM-46(8)	3/4	B	I		5.80	5.91	0.11	5.95	0.15	5.92	0.12	5.99	0.19

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2BD7-12	FM-46(8)	3/4	B	I		6.25	6.18	-0.07	6.22	-0.03	6.40	0.15	6.46	0.21
2BD7-12	FM-46(8)	3/4	B	I		6.25	6.22	-0.03	6.28	0.03	6.34	0.09	6.22	-0.03
2BD7-12	FM-46(8)	3/4	B	I		6.25	6.41	0.16	6.28	0.03	6.34	0.09	6.49	0.24
ABD7-29	BR-810-0(51)	3/4	B	I		5.00	5.17	0.17	5.16	0.16	5.21	0.21	5.10	0.10
ABD7-29	BR-810-0(51)	3/4	B	I		5.50	5.34	-0.16	5.74	0.24	5.42	-0.08	5.49	-0.01
ABD7-29	BR-810-0(51)	3/4	B	I		5.50	5.50	0.00	5.43	-0.07	5.75	0.25	5.36	-0.14
ABD7-212	SR-7849(7)	1/2	B	I		6.10	5.96	-0.14	6.15	0.05	6.14	0.04	6.12	0.02
ABD7-212	SR-7849(7)	1/2	B	I		6.10	5.82	-0.28	6.11	0.01	6.08	-0.02	6.04	-0.06
ABD7-212	SR-7849(7)	1/2	B	I		6.10	5.72	-0.38	6.07	-0.03	6.04	-0.06	6.14	0.04
ABD7-212	SR-7849(7)	1/2	B	I		6.10	5.83	-0.27	6.17	0.07	6.35	0.25	6.12	0.02
ABD7-212	SR-7849(7)	1/2	B	I		6.10	6.10	0.00	6.13	0.03	5.85	-0.25	6.08	-0.02
ABD7-205	SP-687-0(1)	1/2	B	I		5.75	5.69	-0.06	5.77	0.02	5.46	-0.29	5.65	-0.10
ABD7-205	SP-687-0(1)	1/2	B	I		5.75	5.65	-0.10	5.77	0.02	5.82	0.07	5.60	-0.15
ABD7-205	SP-687-0(1)	1/2	B	I		5.75	5.74	-0.01	5.78	0.03	5.52	-0.23	5.63	-0.12
ABD7-198	IR-35-2(199)	3/4	A			4.50	4.88	0.38	4.58	0.08	4.57	0.07	4.69	0.19
ABD7-198	IR-35-2(199)	3/4	A			4.50	4.63	0.13	4.44	-0.06	4.68	0.18	4.49	-0.01
ABD7-198	IR-35-2(199)	3/4	A			5.10	5.08	-0.02	5.04	-0.06	5.05	-0.05	4.99	-0.11
ABD7-198	IR-35-2(199)	3/4	A			5.10	5.25	0.15	5.05	-0.05	5.17	0.07	5.15	0.05
6BD7-15	FM-23(6)	3/4	B	I		6.55	6.89	0.34	6.74	0.19	7.03	0.48	7.03	0.48
6BD7-15	FM-23(6)	3/4	B	I		6.55	6.84	0.29	6.78	0.23	7.26	0.71	7.06	0.51
6BD7-15	FM-23(6)	3/4	B	I		6.55	6.11	-0.44	6.00	-0.55	6.31	-0.24	6.15	-0.40
ABD7-78	FN-130-1(19)	1/2	B	I		6.10	6.18	0.08	6.00	-0.10	6.30	0.20	6.30	0.20
ABD7-78	FN-130-1(19)	1/2	B	I		6.10	5.93	-0.17	6.08	-0.02	6.01	-0.09	5.93	-0.17
ABD7-149	IR-80-3(52)99--12-253/4		A		*	4.75	4.75	0.00	4.93	0.18	4.65	-0.10	4.79	0.04
ABD7-149	IR-80-3(52)99--12-253/4		A		*	4.75	4.54	-0.21	4.66	-0.09	4.76	0.01	4.79	0.04
ABD7-149	IR-80-3(52)99--12-253/4		A		*	4.75	4.60	-0.15	4.66	-0.09	4.76	0.01	4.84	0.09
2BD7-3	MP-111-2(1)	1/2	B	I		7.25	6.76	-0.49	7.38	0.13	7.27	0.02	7.31	0.06
2BD7-3	MP-111-2(1)	1/2	B	I		7.25	6.66	-0.59	7.22	-0.03	7.43	0.18	7.34	0.09
2BD7-3	MP-111-2(1)	1/2	B	I		7.00	6.67	-0.33	7.08	0.08	6.96	-0.04	6.94	-0.06
ABD7-56	MP-6-4(1)	1/2	A			5.30	5.03	-0.27	5.28	-0.02	5.66	0.36	5.12	-0.18
ABD7-56	MP-6-4(1)	1/2	A			5.30	4.53	-0.77	5.24	-0.06	5.41	0.11	4.60	-0.70
ABD7-56	MP-6-4(1)	1/2	A			5.30	4.87	-0.43	5.40	0.10	5.36	0.06	5.00	-0.30

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ABD7-20	FN-150-3(36)	1/2	A			5.80	5.84	0.04	5.79	-0.01	5.80	0.00	5.78	-0.02
ABD7-20	FN-150-3(36)	1/2	A			5.90	6.02	0.12	5.88	-0.02	5.75	-0.15	5.85	-0.05
ABD7-20	FN-150-3(36)	1/2	A			5.90	5.93	0.03	5.89	-0.01	5.89	-0.01	5.86	-0.04
ABD7-65	FN-6-7(31)	3/4	B	I	R	4.90	4.98	0.08	5.03	0.13	5.09	0.19	5.13	0.23
ABD7-65	FN-6-7(31)	3/4	B	I	R	4.90	4.61	-0.29	4.96	0.06	4.76	-0.14	4.67	-0.23
ABD7-114	FN-65-4(15)	3/4	A			5.40	5.43	0.03	5.47	0.07	5.50	0.10	5.45	0.05
ABD7-114	FN-65-4(15)	3/4	A			5.40	5.53	0.13	5.62	0.22	5.48	0.08	5.24	-0.16
ABD7-178	FN-415-1(25)	1/2	A			5.35	5.43	0.08	5.35	0.00	5.41	0.06	5.51	0.16
ABD7-178	FN-415-1(25)	1/2	A			5.35	5.51	0.16	5.34	-0.01	5.53	0.18	5.52	0.17
ABD7-178	FN-415-1(25)	1/2	A			5.35	5.19	-0.16	5.35	0.00	5.36	0.01	5.33	-0.02
ABD7-19	SR-6061(4)	1/2	B	I	R	6.20	6.36	0.16	6.20	0.00	6.24	0.04	6.40	0.20
2ABD7-18	SN-1544(3)	3/4	B	I		5.90	5.93	0.03	5.89	-0.01	6.02	0.12	6.16	0.26
2ABD7-18	SN-1544(3)	3/4	B	I		5.90	5.92	0.02	6.06	0.16	5.63	-0.27	5.86	-0.04
2ABD7-18	SN-1544(3)	3/4	B	I		5.90	5.97	0.07	5.97	0.07	6.01	0.11	6.03	0.13
2ABD7-18	SN-1544(3)	3/4	B	I		5.90	5.79	-0.11	5.89	-0.01	5.62	-0.28	5.68	-0.22
2ABD7-18	SN-1544(3)	3/4	B	I		5.90	5.93	0.03	5.82	-0.08	5.73	-0.17	6.02	0.12
ABD7-167	IR-35-3(47)	3/4	A			5.25	4.99	-0.26	5.28	0.03	5.10	-0.15	4.96	-0.29
ABD7-167	IR-35-3(47)	3/4	A			5.00	4.39	-0.61	4.92	-0.08	4.78	-0.22	4.29	-0.71
ABD7-167	IR-35-3(47)	3/4	A			5.00	4.94	-0.06	4.97	-0.03	4.77	-0.23	4.75	-0.25
ABD7-167	IR-35-3(47)	3/4	A			5.00	4.78	-0.22	5.00	0.00	4.87	-0.13	4.82	-0.18
ABD7-167	IR-35-3(47)	3/4	A			5.00	4.50	-0.50	4.94	-0.06	4.77	-0.23	4.38	-0.62
ABD7-117	FN-59-6(17)	3/4	B	I	R	5.20	4.98	-0.22	5.21	0.01	5.17	-0.03	5.11	-0.09
ABD7-117	FN-59-6(17)	3/4	B	I	R	5.20	5.02	-0.18	5.32	0.12	4.95	-0.25	5.14	-0.06
ABD7-128	IR-29-4(33)	3/4	A			5.00	5.04	0.04	5.15	0.15	5.27	0.27	5.20	0.20
ABD7-128	IR-29-4(33)	3/4	A			5.00	5.11	0.11	5.29	0.29	5.79	0.79	5.31	0.31
ABD7-124	FN-59-6(17)	3/4	A			4.60	4.83	0.23	4.82	0.22	4.92	0.32	4.91	0.31
ABD7-124	FN-59-6(17)	3/4	A			4.30	4.48	0.18	4.24	-0.06	4.87	0.57	4.49	0.19
ABD7-156	IR-80-3(52)99-12-25	1/2	A			4.84	4.95	0.11	4.80	-0.04	4.70	-0.14	4.75	-0.09
ABD7-156	IR-80-3(52)99-12-25	1/2	A			4.80	4.74	-0.06	5.04	0.24	5.03	0.23	5.18	0.38
ABD7-156	IR-80-3(52)99-12-25	1/2	A			4.80	4.73	-0.07	4.81	0.01	5.04	0.24	4.83	0.03

MIX DESIGN NO.	PROJECT-NUMBER	MATERIAL TYPE SIZE	TYPE	CL	R	ASPHALT CEMENT CONTENT DETERMINATIONS INT.	EXT.	DIFF.	T.S.	DIFF.	DNG.	DIFF.	CNG.	DIFF.
ABD7-179	FN-34-9(54)	3/4	A			5.00	5.04	0.04	5.15	0.15	5.28	0.28	5.16	0.16
ABD7-179	FN-34-9(54)	3/4	A			5.40	5.30	-0.10	5.54	0.14	5.82	0.42	5.35	-0.05
ABD7-179	FN-34-9(54)	3/4	A			5.40	5.34	-0.06	5.47	0.07	5.60	0.20	5.29	-0.11
ABD7-179	FN-34-9(54)	3/4	A			5.40	5.17	-0.23	5.27	-0.13	5.31	-0.09	5.23	-0.17
ABD7-130	FN-14-6(16)	3/4	A			5.30	5.52	0.22	5.44	0.14	5.23	-0.07	5.59	0.29
ABD7-130	FN-14-6(16)	3/4	A			5.30	5.36	0.06	5.47	0.17	5.10	-0.20	5.42	0.12
ABD7-130	FN-14-6(16)	3/4	A			5.30	5.11	-0.19	5.54	0.24	5.71	0.41	5.22	-0.08
ABD7-183	FN-14-6(16)	3/4	A			6.10	5.54	-0.56	6.05	-0.05	6.30	0.20	5.79	-0.31
ABD7-48	IR-80-2(114)	1/2	A		R	5.75	5.40	-0.35	5.78	0.03	5.69	-0.06	5.88	0.13
ABD7-48	IR-80-2(114)	1/2	A		R	5.75	5.61	-0.14	5.86	0.11	4.39	-1.36	5.93	0.18
ABD7-48	IR-80-2(114)	1/2	A		R	5.75	5.75	0.00	5.82	0.07	5.61	-0.14	6.04	0.29
ABD7-48	IR-80-2(114)	1/2	A		R	5.75	5.65	-0.10	5.90	0.15	5.91	0.16	6.04	0.29
ABD6-40	FM-11(10)	3/4	B	II		6.50	5.93	-0.57	6.38	-0.12	6.21	-0.29	6.05	-0.45
ABD6-40	SR-3238(6)	3/4	B	II		6.50	6.36	-0.14	6.76	0.26	6.74	0.24	6.57	0.07
ABD6-40	SR-3238(6)	3/4	B	II		6.50	6.27	-0.23	6.47	-0.03	6.49	-0.01	6.45	-0.05
ABD6-40	SR-3238(6)	3/4	B	II		6.50	6.24	-0.26	6.57	0.07	6.44	-0.06	6.50	0.00
2MD7-19(47	SN-3362(2)	3/4	B	I		5.50	5.58	0.08	5.41	-0.09	5.29	-0.21	5.75	0.25
2MD7-19(47	SN-3362(2)	3/4	B	I		5.50	5.27	-0.23	5.46	-0.04	5.79	0.29	5.65	0.15
2MD7-19(47	SN-3362(2)	3/4	B	I		5.50	5.07	-0.43	5.66	0.16	5.15	-0.35	5.49	-0.01
2MD7-19(47	SN-3362(2)	3/4	B	I		5.50	5.53	0.03	5.68	0.18	5.63	0.13	5.75	0.25
3BD7-9	SN-217(8)	3/4	B	II		5.70	5.98	0.28	5.86	0.16	6.13	0.43	6.00	0.30
3BD7-9	SN-217(8)	3/4	B	II		5.70	5.76	0.06	5.84	0.14	6.15	0.45	5.89	0.19
3BD7-9	SN-217(8)	3/4	B	II		5.70	5.84	0.14	5.81	0.11	5.99	0.29	5.91	0.21
3BD7-9	SN-217(8)	3/4	B	II		5.70	5.44	-0.26	5.78	0.08	5.68	-0.02	5.89	0.19
3BD7-9	SN-217(8)	3/4	B	II		5.70	5.79	0.09	5.75	0.05	5.90	0.20	5.97	0.27
ABD7-199	SP-605-0(1)	3/4	B	II		6.50	6.17	-0.33	6.42	-0.08	6.86	0.36	6.76	0.26
ABD7-199	SP-605-0(1)	3/4	B	II		6.30	6.03	-0.27	6.35	0.05	6.66	0.36	6.68	0.38
ABD7-199	SP-605-0(1)	3/4	B	II		6.31	6.23	-0.08	6.32	0.01	6.53	0.22	6.41	0.10
ABD7-199	SP-605-0(1)	3/4	B	II		6.30	5.83	-0.47	6.34	0.04	6.38	0.08	6.61	0.31
ABD7-95	FN-117-1(16)	3/4	A			5.65	5.73	0.08	5.65	0.00	5.38	-0.27	5.47	-0.18
ABD7-95	FN-117-1(16)	3/4	A			5.30	5.45	0.15	5.30	0.00	5.48	0.18	5.41	0.11
ABD7-95	FN-117-1(16)	3/4	A			5.30	5.62	0.32	5.30	0.00	5.15	-0.15	5.31	0.01
ABD7-186	FR-30-1(52)	3/4	A		R	4.70	4.52	-0.18	4.69	-0.01	4.63	-0.07	4.87	0.17
ABD7-186	FR-30-1(52)	3/4	A		R	4.70	4.47	-0.23	4.62	-0.08	4.45	-0.25	4.46	-0.24

MIX DESIGN NO.	PROJECT-NUMBER	MATERIAL TYPE SIZE	TYPE	CL	R	ASPHALT CEMENT CONTENT DETERMINATIONS INT.	EXT.	DIFF.	T.S.	DIFF.	ONG.	DIFF.	CNG.	DIFF.
ABD7-148	FN-3-2(21)	3/4	B	I		5.50	5.55	0.05	5.52	0.02	6.85	1.35	5.83	0.33
ABD7-148	FN-3-2(21)	3/4	B	I		5.00	4.45	-0.55	5.11	0.11	5.19	0.19	4.75	-0.25
ABD7-148	FN-3-2(21)	3/4	B	I		5.00	4.60	-0.40	4.71	-0.29	5.43	0.43	4.74	-0.26
ABD7-111	FN-60-3(11)	1/2	A		R	5.20	5.18	-0.02	5.14	-0.06	5.54	0.34	5.36	0.16
ABD7-111	FN-60-3(11)	1/2	A		R	5.20	5.03	-0.17	5.11	-0.09	5.00	-0.20	4.91	-0.29
ABD7-111	FN-60-3(11)	1/2	A		R	5.20	4.93	-0.27	5.20	0.00	5.26	0.06	4.92	-0.28
ABD7-111	FN-60-3(11)	1/2	A		R	5.20	5.02	-0.18	5.20	0.00	5.26	0.06	4.88	-0.32
ABD7-111	FN-60-3(11)	1/2	A		R	5.20	5.04	-0.16	5.16	-0.04	5.37	0.17	5.09	-0.11
ABD7-72	FN-60-3(11)	3/4	A		R	5.20	4.76	-0.44	5.17	-0.03	5.05	-0.15	4.93	-0.27
ABD7-72	FN-60-3(11)	3/4	A		R	5.20	5.25	0.05	5.43	0.23	5.27	0.07	5.03	-0.17
ABD7-72	FN-60-3(11)	3/4	A		R	5.20	5.27	0.07	5.18	-0.02	5.36	0.16	4.89	-0.31
ABD7-72	FN-60-3(11)	3/4	A		R	5.00	5.19	0.19	5.15	0.15	5.31	0.31	4.99	-0.01
ABD7-72	FN-60-3(11)	3/4	A		R	5.00	5.07	0.07	5.13	0.13	5.29	0.29	4.90	-0.10
ABD7-82	FN-182-1(2)--21-60	3/4	B	I		6.40	6.25	-0.15	6.56	0.16	6.64	0.24	6.24	-0.16
ABD7-82	FN-182-1(2)--21-60	3/4	B	I		5.70	5.39	-0.31	5.75	0.05	5.74	0.04	5.53	-0.17
ABD7-82	FN-182-1(2)--21-60	3/4	B	I		5.70	5.64	-0.06	5.67	-0.03	5.89	0.19	5.57	-0.13
ABD7-82	FN-182-1(2)--21-60	3/4	B	I		5.70	5.56	-0.14	5.73	0.03	5.85	0.15	5.66	-0.04
ABD7-82	FN-182-1(2)--21-60	3/4	B	I		5.70	5.51	-0.19	5.78	0.08	6.07	0.37	5.49	-0.21
ABD7-136	IR-29-4(33)72	3/4	B		R	5.30	5.14	-0.16	5.22	-0.08	5.17	-0.13	5.32	0.02
ABD7-136	IR-29-4(33)72	3/4	B		R	5.30	5.05	-0.25	4.84	-0.46	5.61	0.31	5.16	-0.14
ABD7-132	FN-14-6(16)	1/2	A			5.50	5.17	-0.33	5.46	-0.04	5.66	0.16	5.29	-0.21
ABD7-132	FN-14-6(16)	1/2	A			5.20	4.98	-0.22	5.26	0.06	5.20	0.00	5.11	-0.09
ABD7-132	FN-14-6(16)	1/2	A			5.20	4.86	-0.34	6.26	1.06	5.20	0.00	5.12	-0.08
2MD7-19	FM-99(16)--55-99	3/4	B	I		5.20	5.10	-0.10	5.37	0.17	5.13	-0.07	5.48	0.28
2MD7-19	FM-99(16)--55-99	3/4	B	I		5.50	5.17	-0.33	5.51	0.01	5.31	-0.19	5.43	-0.07
2MD7-19	FM-99(16)--55-99	3/4	B	I		5.50	5.34	-0.16	5.60	0.10	5.55	0.05	5.57	0.07
ABD7-185	FR-63-8(13)	1/2	A			5.90	5.52	-0.38	5.78	-0.12	5.30	-0.60	5.66	-0.24
ABD7-185	FR-63-8(13)	1/2	A			5.90	5.72	-0.18	5.73	-0.17	5.11	-0.79	5.87	-0.03
ABD7-185	FR-63-8(13)	1/2	A			5.90	5.77	-0.13	5.87	-0.03	5.17	-0.73	5.76	-0.14
ABD7-79	FN-415-1(27)	3/4	B	I		5.70	5.52	-0.18	5.75	0.05	5.68	-0.02	5.65	-0.05
ABD7-79	FN-415-1(27)	3/4	B	I		5.70	5.53	-0.17	5.80	0.10	5.71	0.01	5.23	-0.47
ABD7-200	FN-6-4(85)	1/2	A		R	5.40	5.42	0.02	5.40	0.00	5.46	0.06	5.57	0.17
ABD7-200	FN-6-4(85)	1/2	A		R	5.40	5.35	-0.05	5.40	0.00	5.57	0.17	5.64	0.24
ABD7-200	FN-6-4(85)	1/2	A		R	5.40	5.23	-0.17	5.41	0.01	5.44	0.04	5.44	0.04

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ABD6-47	FM-07(10)	3/4	A			5.20	4.77	-0.43	5.21	0.01	4.58	-0.62	4.57	-0.63
ABD6-47	SN-4609(1)	3/4	A			5.20	4.80	-0.40	5.20	0.00	4.78	-0.42	5.07	-0.13
ABD6-47	SN-4609(1)	3/4	A			5.20	4.97	-0.23	5.21	0.01	4.98	-0.22	5.13	-0.07
ABD7-20	SN-4609(1)	1/2	A			6.10	5.99	-0.11	6.08	-0.02	5.80	-0.30	5.94	-0.16
ABD7-20	SN-4609(1)	1/2	A			6.10	6.08	-0.02	6.08	-0.02	6.08	-0.02	5.95	-0.15
ABD7-20	SN-4625(5)	1/2	A			6.10	6.07	-0.03	6.09	-0.01	6.03	-0.07	5.92	-0.18
6BD7-16	FM-23(6)	1/2	B	I		6.55	5.93	-0.62	5.99	-0.56	5.86	-0.69	5.78	-0.77
2BD7-14	SN-1684(1)	3/4	B	I		6.70	6.50	-0.20	6.95	0.25	6.46	-0.24	6.53	-0.17
2BD7-14	SN-1684(1)	3/4	B	I		6.70	6.80	0.10	6.66	-0.04	6.81	0.11	6.95	0.25
2BD7-14	SN-1684(1)	3/4	B	I		6.70	6.37	-0.33	6.76	0.06	6.40	-0.30	6.27	-0.43
2BD7-14	SN-1684(1)	3/4	B	I		6.70	6.43	-0.27	6.83	0.13	6.71	0.01	6.69	-0.01
2BD7-14	SN-1684(1)	3/4	B	I		6.70	6.38	-0.32	6.64	-0.06	6.57	-0.13	6.58	-0.12
5BD7-2	SR-7889(1)	3/4	B	I		5.90	5.42	-0.48	5.97	0.07	6.12	0.22	5.64	-0.26
5BD7-2	SR-7889(1)	3/4	B	I		6.10	5.79	-0.31	6.19	0.09	6.07	-0.03	5.73	-0.37
5BD7-2	SR-7889(1)	3/4	B	I		6.10	5.83	-0.27	6.18	0.08	6.10	0.00	6.10	0.00
5BD7-2	SR-7889(1)	3/4	B	I		6.10	5.85	-0.25	6.26	0.16	5.90	-0.20	6.17	0.07
5BD7-2	SR-7889(1)	3/4	B	I		5.90	5.66	-0.24	5.98	0.08	5.90	0.00	5.90	0.00
ABD7-94	FN-3-5(44)	3/4	B	I	R	6.00	6.05	0.05	6.10	0.10	6.05	0.05	5.74	-0.26
ABD7-94	FN-3-5(44)	3/4	B	I	R	5.50	5.44	-0.06	5.56	0.06	5.14	-0.36	5.08	-0.42
ABD7-94	FN-3-5(44)	3/4	B	I	R	5.50	5.45	-0.05	5.54	0.04	5.51	0.01	5.42	-0.08
ABD7-94	FN-3-5(44)	3/4	B	I	R	5.50	5.10	-0.40	5.61	0.11	5.31	-0.19	5.23	-0.27
ABD7-94	FN-3-5(44)	3/4	B	I	R	5.50	5.24	-0.26	5.55	0.05	5.28	-0.22	5.15	-0.35
2ABD7-2	FM-32(5)	3/4	B	II		6.20	6.31	0.11	6.21	0.01	6.05	-0.15	6.28	0.08
2ABD7-2	FM-32(5)	3/4	B	II		6.20	6.35	0.15	6.33	0.13	6.41	0.21	6.69	0.49
2ABD7-2	FM-32(5)	3/4	B	II		6.20	5.69	-0.51	6.26	0.06	5.95	-0.25	6.27	0.07
2ABD7-2	FM-32(5)	3/4	B	II		6.20	5.94	-0.26	6.30	0.10	6.33	0.13	6.52	0.32
2ABD7-2	FM-32(5)	3/4	B	II		6.20	6.03	-0.17	6.49	0.29	6.60	0.40	6.74	0.54
ABD7-125	FN-67-1(70)	3/4	A			5.00	5.22	0.22	5.16	0.16	5.05	0.05	4.94	-0.06
ABD7-125	FN-67-1(70)	3/4	A			5.00	4.99	-0.01	5.03	0.03	4.82	-0.18	4.67	-0.33
ABD7-125	FN-67-1(70)	3/4	A			5.00	5.08	0.08	4.99	-0.01	4.89	-0.11	4.81	-0.19
ABD7-122	FN-3-5(44)	1/2	A		R	5.90	5.83	-0.07	5.98	0.08	5.58	-0.32	5.80	-0.10
ABD7-122	FN-3-5(44)	1/2	A		R	5.60	5.51	-0.09	5.54	-0.06	5.41	-0.19	5.42	-0.18
ABD7-122	FN-3-5(44)	1/2	A		R	5.60	5.47	-0.13	5.64	0.04	5.40	-0.20	5.56	-0.04
ABD7-122	FN-3-5(44)	1/2	A		R	5.60	5.33	-0.27	5.87	0.27	5.41	-0.19	5.38	-0.22

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6BD7-12	L-AAC(1)87	1/2	B	I		6.85	6.30	-0.55	6.94	0.09	6.29	-0.56	6.44	-0.41
6BD7-12	L-AAC(1)87	1/2	B	I		6.85	6.22	-0.63	6.72	-0.13	6.48	-0.37	6.57	-0.28
6BD7-12	L-AAC(1)87	1/2	B	I		6.85	5.87	-0.98	6.74	-0.11	6.20	-0.65	6.16	-0.69
ABD7-138	FN-18-3(59)	1/2	A			5.40	5.34	-0.06	5.54	0.14	5.05	-0.35	5.15	-0.25
ABD7-138	FN-18-3(59)	1/2	A			5.40	5.33	-0.07	5.44	0.04	4.96	-0.44	5.11	-0.29
ABD7-138	FN-18-3(59)	1/2	A			5.40	5.35	-0.05	5.47	0.07	5.12	-0.28	5.23	-0.17
ABD7-138	FN-18-3(59)	1/2	A			5.40	5.33	-0.07	5.52	0.12	5.31	-0.09	5.15	-0.25
ABD7-96	MP-346-2(1)	3/4	A			6.00	5.58	-0.42	5.87	-0.13	5.56	-0.44	5.70	-0.30
ABD7-96	MP-346-2(1)	3/4	A			6.00	5.88	-0.12	6.00	0.00	5.88	-0.12	5.85	-0.15
ABD7-96	MP-346-2(1)	3/4	A			6.00	5.93	-0.07	6.06	0.06	5.71	-0.29	6.00	0.00
6AB7-4	SN-4822(2)	3/4	B	II		5.80	5.27	-0.53	5.85	0.05	5.50	-0.30	5.36	-0.44
6AB7-4	SN-4822(2)	3/4	B	II		5.80	5.61	-0.19	5.80	0.00	5.60	-0.20	5.61	-0.19
6AB7-4	SN-4822(2)	3/4	B	II		5.80	5.76	-0.04	5.86	0.06	5.74	-0.06	5.68	-0.12
ABD7-53	IR-80-2(114)	3/4	A		R	4.80	4.76	-0.04	4.78	-0.02	4.71	-0.09	4.46	-0.34
ABD7-53	IR-80-2(114)	3/4	A		R	4.80	4.73	-0.07	4.78	-0.02	4.69	-0.11	4.48	-0.32
ABD7-53	IR-80-2(114)	3/4	A		R	4.80	4.74	-0.06	4.76	-0.04	4.72	-0.08	4.43	-0.37
ABD7-6	P-83-0(20)	3/4	A			6.00	5.88	-0.12	5.90	-0.10	5.89	-0.11	6.03	0.03
ABD7-6	P-83-0(20)	3/4	A			6.00	4.81	-1.19	5.91	-0.09	5.95	-0.05	4.90	-1.10
ABD7-64	FN-20-9(73)	3/4	A			5.40	5.17	-0.23	5.52	0.12	5.37	-0.03	5.14	-0.26
2ABD7-16	SR-1665(3)	3/4	B	I		6.10	6.01	-0.09	6.14	0.04	6.05	-0.05	6.22	0.12
2ABD7-16	SR-1665(3)	3/4	B	I		6.10	5.81	-0.29	6.06	-0.04	5.78	-0.32	5.80	-0.30
2ABD7-16	SR-1665(3)	3/4	B	I		6.10	5.89	-0.21	6.03	-0.07	6.05	-0.05	6.03	-0.07
2ABD7-16	SR-1665(3)	3/4	B	I		6.10	5.55	-0.55	6.06	-0.04	5.80	-0.30	5.76	-0.34
2ABD7-16	SR-1665(3)	3/4	B	I		5.90	5.92	0.02	6.02	0.12	5.76	-0.14	6.00	0.10
ABD7-115	FN-18-3(59)	3/4	B	I	R	5.60	5.42	-0.18	5.60	0.00	5.54	-0.06	5.30	-0.30
ABD7-115	FN-18-3(59)	3/4	B	I	R	5.40	4.89	-0.51	5.50	0.10	5.20	-0.20	5.22	-0.18
ABD7-115	FN-18-3(59)	3/4	B	I	R	5.40	5.27	-0.13	5.40	0.00	5.26	-0.14	5.16	-0.24
ABD7-115	FN-18-3(59)	3/4	B	I	R	5.40	5.22	-0.18	5.53	0.13	5.13	-0.27	5.41	0.01
ABD7-115	FN-18-3(59)	3/4	B	I	R	5.40	5.02	-0.38	5.42	0.02	5.19	-0.21	5.09	-0.31
ABD7-131	FN-163-1(40)	3/4	A			4.70	4.71	0.01	4.89	0.19	4.75	0.05	4.70	0.00
ABD7-131	FN-163-1(40)	3/4	A			4.70	4.94	0.24	4.79	0.09	4.81	0.11	4.70	0.00
ABD7-131	FN-163-1(40)	3/4	A			4.70	4.84	0.14	4.79	0.09	4.81	0.11	4.74	0.04

MIX DESIGN NO.	PROJECT-NUMBER	MATERIAL TYPE SIZE	TYPE	CL	R	ASPHALT CEMENT CONTENT DETERMINATIONS INT.	EXT.	DIFF.	T.S.	DIFF.	DNG.	DIFF.	CNG.	DIFF.
ABD7-85	F-20-9(5)	3/4	A			5.70	5.45	-0.25	5.81	0.11	5.58	-0.12	5.44	-0.26
ABD7-85	F-20-9(5)	3/4	A			5.70	5.25	-0.45	5.41	-0.29	5.12	-0.58	5.74	0.04
ABD7-85	F-20-9(5)	3/4	A			5.70	5.54	-0.16	5.61	-0.09	5.64	-0.06	5.36	-0.34
ABD7-85	F-20-9(5)	3/4	A			5.70	5.36	-0.34	5.62	-0.08	5.60	-0.10	5.08	-0.62
ABD7-85	F-20-9(5)	3/4	A			5.70	5.79	0.09	5.75	0.05	5.88	0.18	5.44	-0.26
ABD7-59	FN-130-1(19)	3/4	B	I		6.40	6.01	-0.39	6.40	0.00	6.26	-0.14	6.10	-0.30
ABD7-59	FN-130-1(19)	3/4	B	I		6.40	6.38	-0.02	6.49	0.09	6.40	0.00	6.09	-0.31
ABD7-59	FN-130-1(19)	3/4	B	I		6.40	6.86	0.46	6.37	-0.03	6.79	0.39	6.72	0.32
ABD7-59	FN-130-1(19)	3/4	B	I		6.40	6.75	0.35	6.41	0.01	6.85	0.45	6.63	0.23
ABD7-59	FN-130-1(19)	3/4	B	I		6.40	6.43	0.03	6.37	-0.03	6.61	0.21	6.48	0.08
ABD7-51	FN-92-3(14)	3/4	B	I		5.70	5.51	-0.19	5.58	-0.12	5.61	-0.09	5.22	-0.48
ABD7-51	FN-92-3(14)	3/4	B	I		5.70	5.34	-0.36	5.63	-0.07	5.69	-0.01	5.25	-0.45
ABD7-51	FN-92-3(14)	3/4	B	I		5.80	5.99	0.19	6.04	0.24	5.48	-0.32	5.49	-0.31
ABD7-51	FN-92-3(14)	3/4	B	I		5.80	6.04	0.24	6.05	0.25	5.37	-0.43	5.77	-0.03
1BD7-9	FM-94(11)	3/4	B	I		5.30	4.98	-0.32	5.49	0.19	5.91	0.61	5.26	-0.04
1BD7-9	FM-94(11)	3/4	B	I		5.30	4.94	-0.36	5.32	0.02	4.99	-0.31	5.24	-0.06
1BD7-9	FM-94(11)	3/4	B	I		5.30	4.94	-0.36	5.43	0.13	5.56	0.26	5.12	-0.18
1BD7-9	FM-94(11)	3/4	B	I		5.20	4.91	-0.29	5.21	0.01	5.23	0.03	5.21	0.01
1BD7-9	FM-94(11)	3/4	B	I		5.20	5.03	-0.17	5.23	0.03	5.21	0.01	5.10	-0.10
ABD7-41	FN-92-3(14)	1/2	A			5.40	5.28	-0.12	5.37	-0.03	5.62	0.22	5.79	0.39
ABD7-41	FN-92-3(14)	1/2	A			5.40	4.94	-0.46	5.36	-0.04	5.53	0.13	5.19	-0.21
ABD7-41	FN-92-3(14)	1/2	A			5.40	5.19	-0.21	5.60	0.20	4.83	-0.57	5.21	-0.19
	NO. OF ITEMS					315.00		315.00		315.00		315.00		315.00
	AVERAGES					5.70	5.55	-0.15	5.73	0.03	5.68	-0.02	5.63	-0.07
	STD. DEV. OF DIFFERENCES							0.25		0.13		0.27		0.24

Appendix B
Comparisons to Tank Stick Measurements

ASPHALT CONTENT ANALYSIS:
TANK STICK VS. EXTRACTED, DISTRICT NUCLEAR, & CENTRAL NUCLEAR DETERMINATIONS

MIX DESIGN NO.	PROJECT-NUMBER	MATERIAL TYPE SIZE	TYPE	CL	R	T.S.	ASPHALT CONTENT DETERMINATIONS EXT.	DIFF.	DNG.	DIFF.	CNG.	DIFF.
ABD7-137	IR-35-3(47)	1/2	A			6.14	5.93	-0.21	5.89	-0.25	5.65	-0.49
ABD7-137	IR-35-3(47)	1/2	A			5.95	5.91	-0.04	6.06	0.11	5.82	-0.13
ABD7-137	IR-35-3(47)	1/2	A			6.04	6.19	0.15	6.16	0.12	6.10	0.06
ABD7-137	IR-35-3(47)	1/2	A			6.04	5.95	-0.09	6.16	0.12	6.08	0.04
ABD7-137	IR-35-3(47)	1/2	A			5.69	5.67	-0.02	5.85	0.16	5.94	0.25
6ABD7-3	FM-28(7) & (9)	1/2	B	I		6.76	6.41	-0.35	6.56	-0.20	6.45	-0.31
6ABD7-3	FM-28(7) & (9)	1/2	B	I		6.85	6.66	-0.19	6.71	-0.14	6.75	-0.10
6ABD7-3	FM-28(7) & (9)	1/2	B	I		6.67	6.51	-0.16	6.58	-0.09	6.55	-0.12
6ABD7-3	FM-28(7) & (9)	1/2	B	I		6.69	6.34	-0.35	6.60	-0.09	6.42	-0.27
6ABD7-3	FM-28(7) & (9)	1/2	B	I		6.71	6.50	-0.21	6.73	0.02	6.42	-0.29
3BD7-10	L-RES-3-73-60	1/2	B	II		6.33	6.10	-0.23	6.00	-0.33	6.50	0.17
3BD7-10	L-RES-3-73-60	1/2	B	II		6.39	6.13	-0.26	6.07	-0.32	6.58	0.19
3BD7-10	L-RES-3-73-60	1/2	B	II		6.33	6.10	-0.23	6.34	0.01	6.29	-0.04
3BD7-6	SR-42(1)	3/4	B	II		6.00	5.74	-0.26	6.04	0.04	6.06	0.06
3BD7-6	SR-70(1)	3/4	B	II		5.72	5.35	-0.37	5.85	0.13	5.79	0.07
3BD7-6	SR-62(4)	3/4	B	II		5.80	5.52	-0.28	5.85	0.05	5.76	-0.04
3BD7-6	SN-133(14)	3/4	B	II		5.88	5.25	-0.63	5.91	0.03	5.72	-0.16
3BD7-6	SR-74(1)	3/4	B	II		5.64	5.38	-0.26	5.69	0.05	5.52	-0.12
3BD7-6	L-9-88-73-84	3/4	B	II		5.00	5.18	0.18	5.53	0.53	5.45	0.45
ABD7-194	IR-35-4(55)	3/4	A			4.56	4.27	-0.29	5.00	0.44	4.66	0.10
ABD7-194	IR-35-4(55)	3/4	A			4.58	4.64	0.06	4.78	0.20	4.73	0.15
ABD7-194	IR-35-4(55)	3/4	A			4.52	4.43	-0.09	4.76	0.24	4.90	0.38
1ABD7-1	SN-4689(9)	3/4	B	I		5.96	5.58	-0.38	6.11	0.15	5.80	-0.16
1ABD7-1	SN-4689(9)	3/4	B	I		5.86	5.40	-0.46	5.13	-0.73	5.65	-0.21
1ABD7-1	SN-4689(9)	3/4	B	I		5.59	5.66	0.07	5.90	0.31	6.15	0.56
1ABD7-1	SN-4689(9)	3/4	B	I		6.06	5.88	-0.18	6.35	0.29	5.79	-0.27
1ABD7-1	SN-4689(9)	3/4	B	I		6.30	6.07	-0.23	6.36	0.06	6.24	-0.06
ABD7-182	FN-18-6(23)	1/2	B	I	R	5.70	6.51	0.81	5.42	-0.28	5.68	-0.02
ABD7-182	FN-18-6(23)	1/2	B	I	R	5.65	5.37	-0.28	5.34	-0.31	5.45	-0.20
ABD7-182	FN-18-6(23)	1/2	B	I	R	5.60	5.34	-0.26	5.40	-0.20	5.22	-0.38

MIX DESIGN NO.	PROJECT-NUMBER	MATERIAL SIZE	TYPE	CL	R	T.S.	ASPHALT CONTENT DETERMINATIONS EXT.	DIFF.	DNG.	DIFF.	CNG.	DIFF.
ABD7-146	FN-30-9(44)	3/4	B	I	R	6.10	5.82	-0.28	6.08	-0.02	5.96	-0.14
ABD7-146	FN-30-9(44)	3/4	B	I	R	6.21	6.18	-0.03	6.37	0.16	6.18	-0.03
ABD7-146	FN-30-9(44)	3/4	B	I	R	6.21	5.92	-0.29	6.12	-0.09	6.13	-0.08
ABD7-146	FN-30-9(44)	3/4	B	I	R	6.26	5.98	-0.28	6.13	-0.13	5.96	-0.30
ABD7-146	FN-30-9(44)	3/4	B	I	R	6.10	6.10	0.00	6.08	-0.02	6.02	-0.08
ABD7-129	IR-29-4(38)72-12-43	3/4	A			4.99	5.18	0.19	5.11	0.12	4.62	-0.37
ABD7-129	IR-29-4(38)72-12-43	3/4	A			4.98	4.88	-0.10	5.13	0.15	4.33	-0.65
ABD7-129	IR-29-4(38)72-12-43	3/4	A			4.85	5.08	0.23	5.14	0.29	4.76	-0.09
ABD7-133	IR-35-3(47) & 4(55)	3/4	B	I		5.52	5.16	-0.36	5.47	-0.05	5.51	-0.01
ABD7-133	IR-35-3(47) & 4(55)	3/4	B	I		5.52	5.23	-0.29	5.47	-0.05	5.49	-0.03
ABD7-133	IR-35-3(47) & 4(55)	3/4	B	I		5.50	5.22	-0.28	5.49	-0.01	5.46	-0.04
ABD7-133	IR-35-3(47) & 4(55)	3/4	B	I		5.56	4.97	-0.59	5.42	-0.14	5.46	-0.10
ABD7-133	IR-35-3(47) & 4(55)	3/4	B	I		5.56	5.21	-0.35	5.42	-0.14	5.52	-0.04
3BD7-3	SN-3238(5)	3/4	B	II		5.91	5.85	-0.06	5.91	0.00	5.89	-0.02
3BD7-3	SN-3238(5)	3/4	B	II		6.32	5.63	-0.69	6.16	-0.16	6.06	-0.26
3BD7-3	SN-3238(5)	3/4	B	II		6.33	6.00	-0.33	6.29	-0.04	6.26	-0.07
3BD7-3	SN-3238(5)	3/4	B	II		6.02	5.83	-0.19	6.22	0.20	5.88	-0.14
3BD7-3	SN-3238(5)	3/4	B	II		6.17	5.93	-0.24	5.94	-0.23	5.95	-0.22
6BD7-6	FN-22-3(31)	1/2	A			5.19	5.60	0.41	4.86	-0.33	5.10	-0.09
6BD7-6	FN-22-3(31)	1/2	A			5.10	5.20	0.10	5.00	-0.10	5.13	0.03
6BD7-6	FN-22-3(31)	1/2	A			5.21	5.33	0.12	4.99	-0.22	5.04	-0.17
ABD7-66	FN-6-7(31)	1/2	A		R	5.28	5.03	-0.25	5.23	-0.05	5.08	-0.20
ABD7-66	FN-6-7(31)	1/2	A		R	5.24	5.09	-0.15	5.04	-0.20	5.09	-0.15
ABD7-66	FN-6-7(31)	1/2	A		R	5.16	5.06	-0.10	5.00	-0.16	5.08	-0.08
ABD7-137	IR-35-4(55)	1/2	A			5.94	5.98	0.04	6.20	0.26	6.12	0.18
ABD7-137	IR-35-4(55)	1/2	A			5.83	5.64	-0.19	6.12	0.29	5.64	-0.19
ABD7-137	IR-35-4(55)	1/2	A			5.86	5.76	-0.10	6.37	0.51	6.08	0.22
ABD7-63	F-20-9(65)	1/2	A			5.80	5.68	-0.12	5.86	0.06	5.81	0.01
ABD7-162	SP-631-0(4)	1/2	B	I		5.95	5.90	-0.05	6.18	0.23	6.14	0.19
ABD7-162	SP-631-0(4)	1/2	B	I		5.90	5.85	-0.05	6.38	0.48	5.96	0.06
ABD7-162	SP-631-0(4)	1/2	B	I		5.97	5.99	0.02	6.40	0.43	6.34	0.37

MIX DESIGN NO.	PROJECT-NUMBER	MATERIAL TYPE SIZE	TYPE	CL	R	T.S.	ASPHALT CONTENT DETERMINATIONS EXT.	DIFF.	DNG.	DIFF.	CNG.	DIFF.
4MD7-1	SR-6302(4)	1/2	B	I		6.45	6.06	-0.39	6.01	-0.44	6.08	-0.37
4MD7-1	SR-6302(4)	1/2	B	I		6.29	6.32	0.03	6.41	0.12	5.95	-0.34
4MD7-1	SR-6302(4)	1/2	B	I		6.36	6.47	0.11	6.47	0.11	6.35	-0.01
ABD7-198	IR-35-2(199)	3/4	A			4.51	4.71	0.20	4.62	0.11	4.42	-0.09
3BD7-9(10)	SR-134(1)	3/4	B	II		6.12	5.46	-0.66	6.37	0.25	6.01	-0.11
3BD7-9(10)	SR-134(1)	3/4	B	II		6.51	5.75	-0.76	6.13	-0.38	6.10	-0.41
3BD7-9(10)	SR-134(1)	3/4	B	II		6.21	5.75	-0.46	6.41	0.20	6.47	0.26
3BD7-9(10)	SR-134(1)	3/4	B	II		5.69	5.26	-0.43	6.27	0.58	5.87	0.18
3BD7-9(10)	SR-134(1)	3/4	B	II		6.26	5.56	-0.70	6.34	0.08	6.11	-0.15
2BD7-6	SR-141(1)	3/4	B	I		5.89	5.12	-0.77	5.63	-0.26	5.40	-0.49
2BD7-6	SR-141(1)	3/4	B	I		5.80	5.29	-0.51	5.69	-0.11	5.67	-0.13
2BD7-6	SR-141(1)	3/4	B	I		5.82	5.09	-0.73	5.40	-0.42	5.36	-0.46
ABD7-143	SN-8036(6)	3/4	B	I		5.97	5.93	-0.04	5.72	-0.25	5.55	-0.42
ABD7-143	SN-8036(6)	3/4	B	I		5.78	5.65	-0.13	5.33	-0.45	5.53	-0.25
ABD7-143	SN-8036(6)	3/4	B	I		5.33	5.27	-0.06	5.04	-0.29	5.11	-0.22
ABD7-143	SN-8036(6)	3/4	B	I		5.32	5.25	-0.07	5.26	-0.06	5.25	-0.07
ABD7-143	SN-8036(6)	3/4	B	I		5.40	5.30	-0.10	5.43	0.03	5.43	0.03
1BD7-8	SR-3448(4)	1/2	B	I		6.46	5.83	-0.63	5.74	-0.72	5.93	-0.53
1BD7-8	SR-3448(4)	1/2	B	I		6.31	6.15	-0.16	6.04	-0.27	6.07	-0.24
1BD7-8	SR-3448(4)	1/2	B	I		6.15	6.10	-0.05	5.73	-0.42	6.07	-0.08
1BD7-8	SR-3448(4)	1/2	B	I		6.25	6.16	-0.09	5.79	-0.46	6.16	-0.09
1BD7-8	SR-3448(4)	1/2	B	I		6.23	5.91	-0.32	5.90	-0.33	5.90	-0.33
4BD7-4	SN-3192(11)	1/2	B	I		6.27	6.41	0.14	6.20	-0.07	6.18	-0.09
4BD7-4	SN-3192(11)	1/2	B	I		6.20	6.13	-0.07	6.12	-0.08	6.00	-0.20
4BD7-4	SN-3192(11)	1/2	B	I		5.82	5.98	0.16	5.81	-0.01	5.77	-0.05
4BD7-4	SN-3192(11)	1/2	B	I		6.02	5.96	-0.06	5.68	-0.34	5.81	-0.21
1BD7-7	SN-46(11)	3/4	B	I		5.53	5.68	0.15	5.13	-0.40	5.52	-0.01
1BD7-7	SN-46(11)	3/4	B	I		5.52	5.59	0.07	5.36	-0.16	5.48	-0.04
1BD7-7	SN-46(11)	3/4	B	I		5.44	5.70	0.26	5.53	0.09	5.50	0.06
6BD7-9	SN-4906(4)	1/2	B	I		6.21	5.91	-0.30	6.11	-0.10	6.01	-0.20
6BD7-9	SN-4906(4)	1/2	B	I		6.34	5.97	-0.37	6.03	-0.31	6.20	-0.14
6BD7-9	SN-4906(4)	1/2	B	I		6.39	5.91	-0.48	5.94	-0.45	5.71	-0.68

MIX DESIGN NO.	PROJECT-NUMBER	MATERIAL TYPE SIZE	TYPE	CL	R	T.S.	ASPHALT CONTENT DETERMINATIONS EXT.	DIFF.	DNG.	DIFF.	CNG.	DIFF.
ABD7-32	FN-31-1(13)	3/4	A			5.49	5.58	0.09	5.20	-0.29	5.53	0.04
ABD7-32	FN-31-1(13)	3/4	A			5.49	5.21	-0.28	5.20	-0.29	5.90	0.41
2BD7-11	FM-46(8)	3/4	B	I		5.97	6.07	0.10	6.13	0.16	5.92	-0.05
2BD7-11	FM-46(8)	3/4	B	I		5.95	5.91	-0.04	5.92	-0.03	5.99	0.04
2BD7-12	FM-46(8)	3/4	B	I		6.22	6.18	-0.04	6.40	0.18	6.46	0.24
2BD7-12	FM-46(8)	3/4	B	I		6.28	6.22	-0.06	6.34	0.06	6.22	-0.06
2BD7-12	FM-46(8)	3/4	B	I		6.28	6.41	0.13	6.34	0.06	6.49	0.21
ABD7-29	BR-810-0(51)	3/4	B	I		5.16	5.17	0.01	5.21	0.05	5.10	-0.06
ABD7-29	BR-810-0(51)	3/4	B	I		5.74	5.34	-0.40	5.42	-0.32	5.49	-0.25
ABD7-29	BR-810-0(51)	3/4	B	I		5.43	5.50	0.07	5.75	0.32	5.36	-0.07
ABD7-212	SR-7849(7)	1/2	B	I		6.15	5.96	-0.19	6.14	-0.01	6.12	-0.03
ABD7-212	SR-7849(7)	1/2	B	I		6.11	5.82	-0.29	6.08	-0.03	6.04	-0.07
ABD7-212	SR-7849(7)	1/2	B	I		6.07	5.72	-0.35	6.04	-0.03	6.14	0.07
ABD7-212	SR-7849(7)	1/2	B	I		6.17	5.83	-0.34	6.35	0.18	6.12	-0.05
ABD7-212	SR-7849(7)	1/2	B	I		6.13	6.10	-0.03	5.85	-0.28	6.08	-0.05
ABD7-205	SP-687-0(1)	1/2	B	I		5.77	5.69	-0.08	5.46	-0.31	5.65	-0.12
ABD7-205	SP-687-0(1)	1/2	B	I		5.77	5.65	-0.12	5.82	0.05	5.60	-0.17
ABD7-205	SP-687-0(1)	1/2	B	I		5.78	5.74	-0.04	5.52	-0.26	5.63	-0.15
ABD7-198	IR-35-2(199)	3/4	A			4.58	4.88	0.30	4.57	-0.01	4.69	0.11
ABD7-198	IR-35-2(199)	3/4	A			4.44	4.63	0.19	4.68	0.24	4.49	0.05
ABD7-198	IR-35-2(199)	3/4	A			5.04	5.08	0.04	5.05	0.01	4.99	-0.05
ABD7-198	IR-35-2(199)	3/4	A			5.05	5.25	0.20	5.17	0.12	5.15	0.10
6BD7-15	FM-23(6)	3/4	B	I		6.74	6.89	0.15	7.03	0.29	7.03	0.29
6BD7-15	FM-23(6)	3/4	B	I		6.78	6.84	0.06	7.26	0.48	7.06	0.28
6BD7-15	FM-23(6)	3/4	B	I		6.00	6.11	0.11	6.31	0.31	6.15	0.15
ABD7-78	FN-130-1(19)	1/2	B	I		6.00	6.18	0.18	6.30	0.30	6.30	0.30
ABD7-78	FN-130-1(19)	1/2	B	I		6.08	5.93	-0.15	6.01	-0.07	5.93	-0.15
ABD7-149	IR-80-3(52)99	3/4	A			4.93	4.75	-0.18	4.65	-0.28	4.79	-0.14
ABD7-149	IR-80-3(52)99	3/4	A			4.66	4.54	-0.12	4.76	0.10	4.79	0.13
ABD7-149	IR-80-3(52)99	3/4	A			4.66	4.60	-0.06	4.76	0.10	4.84	0.18

MIX DESIGN NO.	PROJECT-NUMBER	MATERIAL TYPE SIZE	TYPE	CL	R	T.S.	ASPHALT CONTENT DETERMINATIONS EXT.	DIFF.	DNG.	DIFF.	CNG.	DIFF.
2BD7-3	MP-111-2(1)	1/2	B	I		7.38	6.76	-0.62	7.27	-0.11	7.31	-0.07
2BD7-3	MP-111-2(1)	1/2	B	I		7.22	6.66	-0.56	7.43	0.21	7.34	0.12
2BD7-3	MP-111-2(1)	1/2	B	I		7.08	6.67	-0.41	6.96	-0.12	6.94	-0.14
ABD7-56	MP-6-4(1)	1/2	A			5.28	5.03	-0.25	5.66	0.38	5.12	-0.16
ABD7-56	MP-6-4(1)	1/2	A			5.24	4.53	-0.71	5.41	0.17	4.60	-0.64
ABD7-56	MP-6-4(1)	1/2	A			5.40	4.87	-0.53	5.36	-0.04	5.00	-0.40
ABD7-20	FN-150-3(36)	1/2	A			5.79	5.84	0.05	5.80	0.01	5.78	-0.01
ABD7-20	FN-150-3(36)	1/2	A			5.88	6.02	0.14	5.75	-0.13	5.85	-0.03
ABD7-20	FN-150-3(36)	1/2	A			5.89	5.93	0.04	5.89	0.00	5.86	-0.03
ABD7-65	FN-6-7(31)	3/4	B	I	R	5.03	4.98	-0.05	5.09	0.06	5.13	0.10
ABD7-65	FN-6-7(31)	3/4	B	I	R	4.96	4.61	-0.35	4.76	-0.20	4.67	-0.29
ABD7-114	FN-65-4(15)	3/4	A			5.47	5.43	-0.04	5.50	0.03	5.45	-0.02
ABD7-114	FN-65-4(15)	3/4	A			5.62	5.53	-0.09	5.48	-0.14	5.24	-0.38
ABD7-178	FN-415-1(25)	1/2	A			5.35	5.43	0.08	5.41	0.06	5.51	0.16
ABD7-178	FN-415-1(25)	1/2	A			5.34	5.51	0.17	5.53	0.19	5.52	0.18
ABD7-178	FN-415-1(25)	1/2	A			5.35	5.19	-0.16	5.36	0.01	5.33	-0.02
ABD7-19	SR-6061(4)	1/2	B	I	R	6.20	6.36	0.16	6.24	0.04	6.40	0.20
2ABD7-18	SN-1544(3)	3/4	B	I		5.89	5.93	0.04	6.02	0.13	6.16	0.27
2ABD7-18	SN-1544(3)	3/4	B	I		6.06	5.92	-0.14	5.63	-0.43	5.86	-0.20
2ABD7-18	SN-1544(3)	3/4	B	I		5.97	5.97	0.00	6.01	0.04	6.03	0.06
2ABD7-18	SN-1544(3)	3/4	B	I		5.89	5.79	-0.10	5.62	-0.27	5.68	-0.21
2ABD7-18	SN-1544(3)	3/4	B	I		5.82	5.93	0.11	5.73	-0.09	6.02	0.20
ABD7-167	IR-35-3(47)	3/4	A			5.28	4.99	-0.29	5.10	-0.18	4.96	-0.32
ABD7-167	IR-35-3(47)	3/4	A			4.92	4.39	-0.53	4.78	-0.14	4.29	-0.63
ABD7-167	IR-35-3(47)	3/4	A			4.97	4.94	-0.03	4.77	-0.20	4.75	-0.22
ABD7-167	IR-35-3(47)	3/4	A			5.00	4.78	-0.22	4.87	-0.13	4.82	-0.18
ABD7-167	IR-35-3(47)	3/4	A			4.94	4.50	-0.44	4.77	-0.17	4.38	-0.56
ABD7-117	FN-59-6(17)	3/4	B	I	R	5.21	4.98	-0.23	5.17	-0.04	5.11	-0.10
ABD7-117	FN-59-6(17)	3/4	B	I	R	5.32	5.02	-0.30	4.95	-0.37	5.14	-0.18
ABD7-128	IR-29-4(33)	3/4	A			5.15	5.04	-0.11	5.27	0.12	5.20	0.05
ABD7-128	IR-29-4(33)	3/4	A			5.29	5.11	-0.18	5.79	0.50	5.31	0.02

MIX DESIGN NO.	PROJECT-NUMBER	MATERIAL TYPE SIZE	TYPE	CL	R	T.S.	ASPHALT CONTENT DETERMINATIONS EXT.	DIFF.	DNG.	DIFF.	CNG.	DIFF.
ABD7-124	FN-59-6(17)	3/4	A			4.82	4.83	0.01	4.92	0.10	4.91	0.09
ABD7-124	FN-59-6(17)	3/4	A			4.24	4.48	0.24	4.87	0.63	4.49	0.25
ABD7-156	IR-80-3(52)99-12-25	1/2	A			4.80	4.95	0.15	4.70	-0.10	4.75	-0.05
ABD7-156	IR-80-3(52)99-12-25	1/2	A			5.04	4.74	-0.30	5.03	-0.01	5.18	0.14
ABD7-156	IR-80-3(52)99-12-25	1/2	A			4.81	4.73	-0.08	5.04	0.23	4.83	0.02
ABD7-179	FN-34-9(54)	3/4	A			5.15	5.04	-0.11	5.28	0.13	5.16	0.01
ABD7-179	FN-34-9(54)	3/4	A			5.54	5.30	-0.24	5.82	0.28	5.35	-0.19
ABD7-179	FN-34-9(54)	3/4	A			5.47	5.34	-0.13	5.60	0.13	5.29	-0.18
ABD7-179	FN-34-9(54)	3/4	A			5.27	5.17	-0.10	5.31	0.04	5.23	-0.04
ABD7-130	FN-14-6(16)	3/4	A			5.44	5.52	0.08	5.23	-0.21	5.59	0.15
ABD7-130	FN-14-6(16)	3/4	A			5.47	5.36	-0.11	5.10	-0.37	5.42	-0.05
ABD7-130	FN-14-6(16)	3/4	A			5.54	5.11	-0.43	5.71	0.17	5.22	-0.32
ABD7-183	FN-14-6(16)	3/4	A			6.05	5.54	-0.51	6.30	0.25	5.79	-0.26
ABD7-48	IR-80-2(114)	1/2	A		R	5.78	5.40	-0.38	5.69	-0.09	5.88	0.10
ABD7-48	IR-80-2(114)	1/2	A		R	5.86	5.61	-0.25	4.39	-1.47	5.93	0.07
ABD7-48	IR-80-2(114)	1/2	A		R	5.82	5.75	-0.07	5.61	-0.21	6.04	0.22
ABD7-48	IR-80-2(114)	1/2	A		R	5.90	5.65	-0.25	5.91	0.01	6.04	0.14
ABD6-40	FN-11(10)	3/4	B	II		6.38	5.93	-0.45	6.21	-0.17	6.05	-0.33
ABD6-40	SR-3238(6)	3/4	B	II		6.76	6.36	-0.40	6.74	-0.02	6.57	-0.19
ABD6-40	SR-3238(6)	3/4	B	II		6.47	6.27	-0.20	6.49	0.02	6.45	-0.02
ABD6-40	SR-3238(6)	3/4	B	II		6.57	6.24	-0.33	6.44	-0.13	6.50	-0.07
2MD7-19(47	SN-3362(2)	3/4	B	I		5.41	5.58	0.17	5.29	-0.12	5.75	0.34
2MD7-19(47	SN-3362(2)	3/4	B	I		5.46	5.27	-0.19	5.79	0.33	5.65	0.19
2MD7-19(47	SN-3362(2)	3/4	B	I		5.66	5.07	-0.59	5.15	-0.51	5.49	-0.17
2MD7-19(47	SN-3362(2)	3/4	B	I		5.68	5.53	-0.15	5.63	-0.05	5.75	0.07
3BD7-9	SN-217(8)	3/4	B	II		5.86	5.98	0.12	6.13	0.27	6.00	0.14
3BD7-9	SN-217(8)	3/4	B	II		5.84	5.76	-0.08	6.15	0.31	5.89	0.05
3BD7-9	SN-217(8)	3/4	B	II		5.81	5.84	0.03	5.99	0.18	5.91	0.10
3BD7-9	SN-217(8)	3/4	B	II		5.78	5.44	-0.34	5.68	-0.10	5.89	0.11
3BD7-9	SN-217(8)	3/4	B	II		5.75	5.79	0.04	5.90	0.15	5.97	0.22
ABD7-199	SP-605-0(1)	3/4	B	II		6.42	6.17	-0.25	6.86	0.44	6.76	0.34
ABD7-199	SP-605-0(1)	3/4	B	II		6.35	6.03	-0.32	6.66	0.31	6.68	0.33
ABD7-199	SP-605-0(1)	3/4	B	II		6.32	6.23	-0.09	6.53	0.21	6.41	0.09
ABD7-199	SP-605-0(1)	3/4	B	II		6.34	5.83	-0.51	6.38	0.04	6.61	0.27

MIX DESIGN NO.	PROJECT-NUMBER	MATERIAL TYPE SIZE	TYPE	CL	R	T.S.	ASPHALT CONTENT DETERMINATIONS EXT.	DIFF.	DNG.	DIFF.	CNG.	DIFF.
ABD7-95	FN-117-1(16)	3/4	A			5.65	5.73	0.08	5.38	-0.27	5.47	-0.18
ABD7-95	FN-117-1(16)	3/4	A			5.30	5.45	0.15	5.48	0.18	5.41	0.11
ABD7-95	FN-117-1(16)	3/4	A			5.30	5.62	0.32	5.15	-0.15	5.31	0.01
ABD7-186	FR-30-1(52)	3/4	A		R	4.69	4.52	-0.17	4.63	-0.06	4.87	0.18
ABD7-186	FR-30-1(52)	3/4	A		R	4.62	4.47	-0.15	4.45	-0.17	4.46	-0.16
		77.00										
ABD7-148	FN-3-2(21)	3/4	B	I		5.52	5.55	0.03	6.85	1.33	5.83	0.31
ABD7-148	FN-3-2(21)	3/4	B	I		5.11	4.45	-0.66	5.19	0.08	4.75	-0.36
ABD7-148	FN-3-2(21)	3/4	B	I		4.71	4.60	-0.11	5.43	0.72	4.74	0.03
ABD7-111	FN-60-3(11)	1/2	A		R	5.14	5.18	0.04	5.54	0.40	5.36	0.22
ABD7-111	FN-60-3(11)	1/2	A		R	5.11	5.03	-0.08	5.00	-0.11	4.91	-0.20
ABD7-111	FN-60-3(11)	1/2	A		R	5.20	4.93	-0.27	5.26	0.06	4.92	-0.28
ABD7-111	FN-60-3(11)	1/2	A		R	5.20	5.02	-0.18	5.26	0.06	4.88	-0.32
ABD7-111	FN-60-3(11)	1/2	A		R	5.16	5.04	-0.12	5.37	0.21	5.09	-0.07
ABD7-72	FN-60-3(11)	3/4	A		R	5.17	4.76	-0.41	5.05	-0.12	4.93	-0.24
ABD7-72	FN-60-3(11)	3/4	A		R	5.43	5.25	-0.18	5.27	-0.16	5.03	-0.40
ABD7-72	FN-60-3(11)	3/4	A		R	5.18	5.27	0.09	5.36	0.18	4.89	-0.29
ABD7-72	FN-60-3(11)	3/4	A		R	5.15	5.19	0.04	5.31	0.16	4.99	-0.16
ABD7-72	FN-60-3(11)	3/4	A		R	5.13	5.07	-0.06	5.29	0.16	4.90	-0.23
ABD7-82	FN-182-1(2)--21-60	3/4	B	I		6.56	6.25	-0.31	6.64	0.08	6.24	-0.32
ABD7-82	FN-182-1(2)--21-60	3/4	B	I		5.75	5.39	-0.36	5.74	-0.01	5.53	-0.22
ABD7-82	FN-182-1(2)--21-60	3/4	B	I		5.67	5.64	-0.03	5.89	0.22	5.57	-0.10
ABD7-82	FN-182-1(2)--21-60	3/4	B	I		5.73	5.56	-0.17	5.85	0.12	5.66	-0.07
ABD7-82	FN-182-1(2)--21-60	3/4	B	I		5.78	5.51	-0.27	6.07	0.29	5.49	-0.29
ABD7-136	IR-29-4(33)72	3/4	B		R	5.22	5.14	-0.08	5.17	-0.05	5.32	0.10
ABD7-136	IR-29-4(33)72	3/4	B		R	4.84	5.05	0.21	5.61	0.77	5.16	0.32
ABD7-132	FN-14-6(16)	1/2	A			5.46	5.17	-0.29	5.66	0.20	5.29	-0.17
ABD7-132	FN-14-6(16)	1/2	A			5.26	4.98	-0.28	5.20	-0.06	5.11	-0.15
ABD7-132	FN-14-6(16)	1/2	A			6.26	4.86	-1.40	5.20	-1.06	5.12	-1.14
2MD7-19	FN-99(16)--55-99	3/4	B	I		5.37	5.10	-0.27	5.13	-0.24	5.48	0.11
2MD7-19	FN-99(16)--55-99	3/4	B	I		5.51	5.17	-0.34	5.31	-0.20	5.43	-0.08
2MD7-19	FN-99(16)--55-99	3/4	B	I		5.60	5.34	-0.26	5.55	-0.05	5.57	-0.03
ABD7-185	FR-63-8(13)	1/2	A			5.78	5.52	-0.26	5.30	-0.48	5.66	-0.12
ABD7-185	FR-63-8(13)	1/2	A			5.73	5.72	-0.01	5.11	-0.62	5.87	0.14
ABD7-185	FR-63-8(13)	1/2	A			5.87	5.77	-0.10	5.17	-0.70	5.76	-0.11

MIX DESIGN NO.	PROJECT-NUMBER	MATERIAL TYPE SIZE	TYPE	CL	R	T.S.	ASPHALT CONTENT DETERMINATIONS EXT.	DIFF.	DNG.	DIFF.	CNG.	DIFF.
ABD7-79	FM-415-1(27)	3/4	B	I		5.75	5.52	-0.23	5.68	-0.07	5.65	-0.10
ABD7-79	FM-415-1(27)	3/4	B	I		5.80	5.53	-0.27	5.71	-0.09	5.23	-0.57
ABD7-200	FM-6-4(85)	1/2	A		R	5.40	5.42	0.02	5.46	0.06	5.57	0.17
ABD7-200	FM-6-4(85)	1/2	A		R	5.40	5.35	-0.05	5.57	0.17	5.64	0.24
ABD7-200	FM-6-4(85)	1/2	A		R	5.41	5.23	-0.18	5.44	0.03	5.44	0.03
ABD6-47	FM-07(10)	3/4	A			5.21	4.77	-0.44	4.58	-0.63	4.57	-0.64
ABD6-47	SM-4609(1)	3/4	A			5.20	4.80	-0.40	4.78	-0.42	5.07	-0.13
ABD6-47	SM-4609(1)	3/4	A			5.21	4.97	-0.24	4.98	-0.23	5.13	-0.08
ABD7-20	SM-4609(1)	1/2	A			6.08	5.99	-0.09	5.80	-0.28	5.94	-0.14
ABD7-20	SM-4609(1)	1/2	A			6.08	6.08	0.00	6.08	0.00	5.95	-0.13
ABD7-20	SM-4625(5)	1/2	A			6.09	6.07	-0.02	6.03	-0.06	5.92	-0.17
6BD7-16	FM-23(6)	1/2	B	I		5.99	5.93	-0.06	5.86	-0.13	5.78	-0.21
2BD7-14	SM-1684(1)	3/4	B	I		6.95	6.50	-0.45	6.46	-0.49	6.53	-0.42
2BD7-14	SM-1684(1)	3/4	B	I		6.66	6.80	0.14	6.81	0.15	6.95	0.29
2BD7-14	SM-1684(1)	3/4	B	I		6.76	6.37	-0.39	6.40	-0.36	6.27	-0.49
2BD7-14	SM-1684(1)	3/4	B	I		6.83	6.43	-0.40	6.71	-0.12	6.69	-0.14
2BD7-14	SM-1684(1)	3/4	B	I		6.64	6.38	-0.26	6.57	-0.07	6.58	-0.06
5BD7-2	SR-7889(1)	3/4	B	I		5.97	5.42	-0.55	6.12	0.15	5.64	-0.33
5BD7-2	SR-7889(1)	3/4	B	I		6.19	5.79	-0.40	6.07	-0.12	5.73	-0.46
5BD7-2	SR-7889(1)	3/4	B	I		6.18	5.83	-0.35	6.10	-0.08	6.10	-0.08
5BD7-2	SR-7889(1)	3/4	B	I		6.26	5.85	-0.41	5.90	-0.36	6.17	-0.09
5BD7-2	SR-7889(1)	3/4	B	I		5.98	5.66	-0.32	5.90	-0.08	5.90	-0.08
ABD7-94	FM-3-5(44)	3/4	B	I	R	6.10	6.05	-0.05	6.05	-0.05	5.74	-0.36
ABD7-94	FM-3-5(44)	3/4	B	I	R	5.56	5.44	-0.12	5.14	-0.42	5.08	-0.48
ABD7-94	FM-3-5(44)	3/4	B	I	R	5.54	5.45	-0.09	5.51	-0.03	5.42	-0.12
ABD7-94	FM-3-5(44)	3/4	B	I	R	5.61	5.10	-0.51	5.31	-0.30	5.23	-0.38
ABD7-94	FM-3-5(44)	3/4	B	I	R	5.55	5.24	-0.31	5.28	-0.27	5.15	-0.40
2ABD7-2	FM-32(5)	3/4	B	II		6.21	6.31	0.10	6.05	-0.16	6.28	0.07
2ABD7-2	FM-32(5)	3/4	B	II		6.33	6.35	0.02	6.41	0.08	6.69	0.36
2ABD7-2	FM-32(5)	3/4	B	II		6.26	5.69	-0.57	5.95	-0.31	6.27	0.01
2ABD7-2	FM-32(5)	3/4	B	II		6.30	5.94	-0.36	6.33	0.03	6.52	0.22
2ABD7-2	FM-32(5)	3/4	B	II		6.49	6.03	-0.46	6.60	0.11	6.74	0.25

MIX DESIGN NO.	PROJECT-NUMBER	MATERIAL TYPE SIZE	TYPE	CL	R	T.S.	ASPHALT CONTENT DETERMINATIONS EXT.	DIFF.	DNG.	DIFF.	CNG.	DIFF.
ABD7-125	FN-67-1(70)	3/4	A			5.16	5.22	0.06	5.05	-0.11	4.94	-0.22
ABD7-125	FN-67-1(70)	3/4	A			5.03	4.99	-0.04	4.82	-0.21	4.67	-0.36
ABD7-125	FN-67-1(70)	3/4	A			4.99	5.08	0.09	4.89	-0.10	4.81	-0.18
ABD7-122	FN-3-5(44)	1/2	A		R	5.98	5.83	-0.15	5.58	-0.40	5.80	-0.18
ABD7-122	FN-3-5(44)	1/2	A		R	5.54	5.51	-0.03	5.41	-0.13	5.42	-0.12
ABD7-122	FN-3-5(44)	1/2	A		R	5.64	5.47	-0.17	5.40	-0.24	5.56	-0.08
ABD7-122	FN-3-5(44)	1/2	A		R	5.87	5.33	-0.54	5.41	-0.46	5.38	-0.49
6BD7-12	L-AAC(1)87	1/2	B	I		6.94	6.30	-0.64	6.29	-0.65	6.44	-0.50
6BD7-12	L-AAC(1)87	1/2	B	I		6.72	6.22	-0.50	6.48	-0.24	6.57	-0.15
6BD7-12	L-AAC(1)87	1/2	B	I		6.74	5.87	-0.87	6.20	-0.54	6.16	-0.58
ABD7-138	FN-18-3(59)	1/2	A			5.54	5.34	-0.20	5.05	-0.49	5.15	-0.39
ABD7-138	FN-18-3(59)	1/2	A			5.44	5.33	-0.11	4.96	-0.48	5.11	-0.33
ABD7-138	FN-18-3(59)	1/2	A			5.47	5.35	-0.12	5.12	-0.35	5.23	-0.24
ABD7-138	FN-18-3(59)	1/2	A			5.52	5.33	-0.19	5.31	-0.21	5.15	-0.37
ABD7-96	MP-346-2(1)	3/4	A			5.87	5.58	-0.29	5.56	-0.31	5.70	-0.17
ABD7-96	MP-346-2(1)	3/4	A			6.00	5.88	-0.12	5.88	-0.12	5.85	-0.15
ABD7-96	MP-346-2(1)	3/4	A			6.06	5.93	-0.13	5.71	-0.35	6.00	-0.06
6AB7-4	SN-4822(2)	3/4	B	II		5.85	5.27	-0.58	5.50	-0.35	5.36	-0.49
6AB7-4	SN-4822(2)	3/4	B	II		5.80	5.61	-0.19	5.60	-0.20	5.61	-0.19
6AB7-4	SN-4822(2)	3/4	B	II		5.86	5.76	-0.10	5.74	-0.12	5.68	-0.18
ABD7-53	IR-80-2(114)	3/4	A		R	4.78	4.76	-0.02	4.71	-0.07	4.46	-0.32
ABD7-53	IR-80-2(114)	3/4	A		R	4.78	4.73	-0.05	4.69	-0.09	4.48	-0.30
ABD7-53	IR-80-2(114)	3/4	A		R	4.76	4.74	-0.02	4.72	-0.04	4.43	-0.33
ABD7-6	P-83-0(20)	3/4	A			5.90	5.88	-0.02	5.89	-0.01	6.03	0.13
ABD7-6	P-83-0(20)	3/4	A			5.91	4.81	-1.10	5.95	0.04	4.90	-1.01
ABD7-64	FN-20-9(73)	3/4	A			5.52	5.17	-0.35	5.37	-0.15	5.14	-0.38
2ABD7-16	SR-1665(3)	3/4	B	I		6.14	6.01	-0.13	6.05	-0.09	6.22	0.08
2ABD7-16	SR-1665(3)	3/4	B	I		6.06	5.81	-0.25	5.78	-0.28	5.80	-0.26
2ABD7-16	SR-1665(3)	3/4	B	I		6.03	5.89	-0.14	6.05	0.02	6.03	0.00
2ABD7-16	SR-1665(3)	3/4	B	I		6.06	5.55	-0.51	5.80	-0.26	5.76	-0.30
2ABD7-16	SR-1665(3)	3/4	B	I		6.02	5.92	-0.10	5.76	-0.26	6.00	-0.02

MIX DESIGN NO.	PROJECT-NUMBER	MATERIAL TYPE SIZE	TYPE	CL	R	T.S.	ASPHALT CONTENT DETERMINATIONS EXT.	DIFF.	ONG.	DIFF.	CNG.	DIFF.
ABD7-115	FN-18-3(59)	3/4	B	I	R	5.60	5.42	-0.18	5.54	-0.06	5.30	-0.30
ABD7-115	FN-18-3(59)	3/4	B	I	R	5.50	4.89	-0.61	5.20	-0.30	5.22	-0.28
ABD7-115	FN-18-3(59)	3/4	B	I	R	5.40	5.27	-0.13	5.26	-0.14	5.16	-0.24
ABD7-115	FN-18-3(59)	3/4	B	I	R	5.53	5.22	-0.31	5.13	-0.40	5.41	-0.12
ABD7-115	FN-18-3(59)	3/4	B	I	R	5.42	5.02	-0.40	5.19	-0.23	5.09	-0.33
ABD7-131	FN-163-1(40)	3/4	A			4.89	4.71	-0.18	4.75	-0.14	4.70	-0.19
ABD7-131	FN-163-1(40)	3/4	A			4.79	4.94	0.15	4.81	0.02	4.70	-0.09
ABD7-131	FN-163-1(40)	3/4	A			4.79	4.84	0.05	4.81	0.02	4.74	-0.05
ABD7-85	F-20-9(5)	3/4	A			5.81	5.45	-0.36	5.58	-0.23	5.44	-0.37
ABD7-85	F-20-9(5)	3/4	A			5.41	5.25	-0.16	5.12	-0.29	5.74	0.33
ABD7-85	F-20-9(5)	3/4	A			5.61	5.54	-0.07	5.64	0.03	5.36	-0.25
ABD7-85	F-20-9(5)	3/4	A			5.62	5.36	-0.26	5.60	-0.02	5.08	-0.54
ABD7-85	F-20-9(5)	3/4	A			5.75	5.79	0.04	5.88	0.13	5.44	-0.31
ABD7-59	FN-130-1(19)	3/4	B	I		6.40	6.01	-0.39	6.26	-0.14	6.10	-0.30
ABD7-59	FN-130-1(19)	3/4	B	I		6.49	6.38	-0.11	6.40	-0.09	6.09	-0.40
ABD7-59	FN-130-1(19)	3/4	B	I		6.37	6.86	0.49	6.79	0.42	6.72	0.35
ABD7-59	FN-130-1(19)	3/4	B	I		6.41	6.75	0.34	6.85	0.44	6.63	0.22
ABD7-59	FN-130-1(19)	3/4	B	I		6.37	6.43	0.06	6.61	0.24	6.48	0.11
ABD7-51	FN-92-3(14)	3/4	B	I		5.58	5.51	-0.07	5.61	0.03	5.22	-0.36
ABD7-51	FN-92-3(14)	3/4	B	I		5.63	5.34	-0.29	5.69	0.06	5.25	-0.38
ABD7-51	FN-92-3(14)	3/4	B	I		6.04	5.99	-0.05	5.48	-0.56	5.49	-0.55
ABD7-51	FN-92-3(14)	3/4	B	I		6.05	6.04	-0.01	5.37	-0.68	5.77	-0.28
1BD7-9	FM-94(11)	3/4	B	I		5.49	4.98	-0.51	5.91	0.42	5.26	-0.23
1BD7-9	FM-94(11)	3/4	B	I		5.32	4.94	-0.38	4.99	-0.33	5.24	-0.08
1BD7-9	FM-94(11)	3/4	B	I		5.43	4.94	-0.49	5.56	0.13	5.12	-0.31
1BD7-9	FM-94(11)	3/4	B	I		5.21	4.91	-0.30	5.23	0.02	5.21	0.00
1BD7-9	FM-94(11)	3/4	B	I		5.23	5.03	-0.20	5.21	-0.02	5.10	-0.13
ABD7-41	FN-92-3(14)	1/2	A			5.37	5.28	-0.09	5.62	0.25	5.79	0.42
ABD7-41	FN-92-3(14)	1/2	A			5.36	4.94	-0.42	5.53	0.17	5.19	-0.17
ABD7-41	FN-92-3(14)	1/2	A			5.60	5.19	-0.41	4.83	-0.77	5.21	-0.39
	NO. OF ITEMS					315.00	315.00	315.00	315.00	315.00	315.00	315.00
	AVERAGES					5.73	5.55	-0.18	5.68	-0.05	5.63	-0.10
	STD. DEV. OF DIFFERENCES							0.25		0.28		0.24